



Department of Health & Human Services
Office of the National Coordinator for
Health Information Technology



ALLIANCE
The National Alliance for
Health Information Technology

**The National Alliance for Health Information Technology
Report to the Office of the National Coordinator for Health Information Technology
on
Defining Key Health Information Technology Terms
April 28, 2008**

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FOREWORD

In 2004, United States President George Bush called for most Americans to have electronic health records by 2014. While few would have imagined what that really could mean to the providers of health care, patients and consumers, and those dependent on gathering health-related information from multiple sources, one thing was certain: he was not referring to electronic versions of the paper records used in most clinical settings at the time.

The types of electronic records that would support the outcomes that were and are still anticipated are part of a health information technology infrastructure that will ultimately allow authorized access to fully comprehensive patient and consumer health related information for multiple appropriate activities: patient care, consumer self-management of health, and a multitude of research, emergency response, and public health initiatives. Another part of that infrastructure is the system of health information exchange networks that can support secure and reliable information exchange within their constituency, and with other similar networks. Both the electronic records and the system of networks must, however, have incorporated recognized standards for interoperability and for the secure and reliable exchange of health information.

As of today, we do not have all the critical pieces in place to realize the vision. They are, however, just around the corner. The Certification Commission for Health Information Technology has incorporated basic interoperability standards for patient care as part of its 2008 certification criteria. Nine sites implementing the core specifications for health information exchange are the first of many that will constitute the Nationwide Health Information Network. We are on the cusp of a cataclysmic change in how health and care will be managed into the future as more and more information becomes available through expanded adoption of interoperable technologies.

Realizing the vision is not, however, just about the enabling technology. It's also, to quote Secretary Michael Leavitt in his keynote address at the February 2008 HIMSS Annual Conference & Exhibition in Orlando, very much about sociology and culture change. Both clinicians and consumers need to feel that privacy and security needs are addressed appropriately. Everyone must see the value in creating, exchanging, and using electronic health information, and contribute to its investment. And, as in any culture, we need to clearly communicate with one another, so that our health policies are well informed, products can be marketed with transparency, and protections can be applied to well-defined situations.

Culture change requires a consistent language that can support a system of public policies, private development, and outreach/educational initiatives that will allow the majority of Americans to experience the actual value of an electronic health information infrastructure.

Our next step, then, is to assure that this language is in place and represents a consensus on how terminology and definitions should be used as we move toward the 2014 goal. I am pleased that The National Alliance for Health Information Technology has convened this public dialogue and presents here the results.

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EXECUTIVE SUMMARY

The potential for information technology to have an impact on health care safety, cost, and quality has never been greater. The technology to create, transmit, store and manage individuals' health data is rapidly advancing. Significantly, this potential is recognized at the highest levels of government and in the private sector as both confront the spiraling costs and inefficiencies of health care. As health IT initiatives gain momentum, there is increasing appreciation for the degree to which they can:

- Improve the coordination of care within the health care delivery system by increased sharing of health information among authorized clinicians, elevating the standard of care for everyone.
- Provide individuals with electronic access to their own health and wellness information, engaging them in opportunities for improving their health and well-being.
- Improve the health of the community using aggregated health data for research, public health, emergency preparedness and quality improvement efforts.

Realizing these benefits requires an underlying infrastructure that can support the use of patient-focused electronic health information, information that goes beyond the limitations of a specific provider, health plan or delivery system. It also includes the process of sharing health-related information in a secure manner, protecting the confidentiality of the information. The building blocks associated with this infrastructure are currently referred to as the electronic medical record (EMR) and/or electronic health record (EHR) for health care professionals, personal health record (PHR) for individuals, and health information exchange (HIE) to tie the infrastructure together. A regional health information organization (RHIO) organizes all of these components into a local infrastructure.

The recent surge of activity from both public and private sectors to use and share health-related information has proceeded without a discussion concerning what these building blocks actually are and how they fit together in a clearly understood model. Myriad meanings for each term emerged and the relationships among the terms were inadequately defined. There was, and is, no clear language underlying health IT adoption.

The ambiguity of meaning created by not having a shared understanding of what these key terms signify becomes an obstacle to progress in health IT adoption when questions about a term's definition and application complicate important policy expectations or directives, contractual matters, and product features. Differences in how a term is used can cause confusion and misunderstanding about what is being purchased, considered in proposed legislation, or included in current applicable policies and regulations.

To address these issues and to provide support for increased adoption of health IT, The Office of the National Coordinator for Health Information Technology (ONC) issued a contract to reach consensus on definitions for the terms EMR, EHR, PHR, HIE and RHIO. As discussions and public comments took place around the meanings of these terms it was noted that dual interpretations of HIE existed, as both a process and an entity. As such, there arose a need to clarify the difference between the process of information exchange and the oversight and accountability functions necessary to support that process. To address this need, a sixth term, health information organization (HIO), was added and defined.

In this report, The National Alliance for Health Information Technology (Alliance), under the guidance of BearingPoint, Inc., a management and technology consulting firm, summarizes the deliberations and conclusions of the two work groups that were formed to gain consensus on the definition of these terms. To assist the work groups in reaching consensus, a comprehensive literature review to identify existing definitions was performed, and public forums and public comment periods were conducted to vet the work while in development. This collaborative, consensus-building effort ran from September 2007 through April 2008. The two main objectives

of creating the proposed definitions were to eliminate confusion around the terms and to provide health care stakeholders with common understanding of the important components of the health IT infrastructure. The definitions in this report, when put into practice, will result in a number of benefits including:

- Health IT concepts expressed in a language that individuals comprehend.
- Standard terms for policy makers to use when drafting and evaluating policies.
- Important reference points for health IT initiatives.
- More effective contracting between health IT vendors and their customers.

These definitions will not, and are not intended to, solve all the challenges facing health IT adoption. However, they do represent an important foundation for addressing some important adoption issues.

Major themes from work group deliberations and public comments

Discussions arising from Alliance-led work group meetings and observations collected from two public forums and two public comment periods helped identify several major themes concerning electronic records and sharing of health-related information:

Interoperability is the common thread running through health IT terms. Interoperability is the essential factor in building the infrastructure to create, transmit, store and manage health-related information.

Nationally recognized standards are required to enable the flow of information. EHRs, PHRs, and HIE require the use of nationally recognized interoperability standards to enable the flow of information reliably, consistently, accurately, and securely.

The principal difference between an EMR and an EHR is the ability to exchange information interoperably. An EMR aligns with the prevailing state of electronic records today (whether the record is branded an EMR or an EHR). However, the movement of the industry is toward electronic records that are capable of using nationally recognized interoperability standards, which is a key defining component of an EHR. With the passage of time, electronic records not capable of exchanging information interoperably will lose their relevance. Thus the term EMR is on course for eventual retirement.

Control of information distinguishes EHR from PHR. The information in a PHR, whether contributed from an EHR or through other sources, is for the individual to manage and decide how it is accessed and used. Electronic portals of information on an individual that are hosted by a provider or payer organization, without transferring the control of the information to the individual, are not PHRs but rather examples of giving individuals access to information in an EHR.

Records contain health-related information. Because of their historical origin, the prevailing terms for electronic records retain an outdated differentiation based on a “medical” or “health” orientation. In fact, both types of records can and do contain a broad range of health-related information, and the differentiation is now along the lines of readiness to make that health-related information interoperable. In this report, health-related information refers to clinical and administrative, health and wellness data and information.

HIE is process. HIO is an oversight organization and RHIO is a type of HIO. In many instances, HIE has been used to describe both the process of health information exchange and the entity overseeing and governing the exchange. Consequently, HIE and RHIO were often used interchangeably. To provide greater clarity, three terms are defined to achieve both separation of meaning and a construct to accommodate a wide range of current and future organizations for information sharing.

Proposed Health IT Terms Definitions

The Alliance-led work groups recognize the definitions are written for three main constituencies: non-technical leaders in health care delivery, policymakers with responsibility and accountability for decisions in the area of health IT, and members of the general public who are being asked to participate more fully in their care and wellness activities but need education and tools to do so. It was also acknowledged that there are a number of parallel efforts to further specify these terms, particularly among standards development organizations. Although the work of these organizations was consulted, the definitions in this report are not intended to be detailed functionality specifications, but instead are intended to support and align with these efforts.

The proposed definitions are as follows.

Table 1: Records Terms

Electronic Medical Record	Electronic Health Record	Personal Health Record
An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization.	An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one health care organization.	An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be drawn from multiple sources while being managed, shared, and controlled by the individual.

Table 2: Network Terms

Health Information Exchange	Health Information Organization	Regional Health Information Organization
The electronic movement of health-related information among organizations according to nationally recognized standards.	An organization that oversees and governs the exchange of health-related information among organizations according to nationally recognized standards.	A health information organization that brings together health care stakeholders within a defined geographic area and governs health information exchange among them for the purpose of improving health and care in that community.

Throughout the report, there has been an attempt to make the definitions clear, concise, and in keeping with good defining practice. However, the Alliance and the work groups recognize the importance of explaining some of the broader relationships and implications of each of the definitions. To this end, the report has been organized into the following sections:

- An introduction describing the nature of the problem and its implications, the benefits and potential uses of consensus definitions, the scope of the project, and the approach used to develop the definitions.
- A discussion of interoperability as the common thread running through health IT terms as a core foundational component.
- A records terms section presenting consensus definitions and rationale to explain the terms EMR, EHR and PHR.
- A network terms section presenting consensus definitions and rational to explain the terms HIE, HIO and RHIO.
- A look forward, envisioning how the definitions can support an interoperable infrastructure to realize the benefits of health IT.

PROJECT INTRODUCTION

A transformation in health care is being enabled by health IT, and the potential for information technology to have an impact on health care safety, cost, and quality is great. This potential is recognized at the highest levels of government and within the private sector as both confront the spiraling costs and inefficiencies of health care. As health IT initiatives gain momentum, there is increasing appreciation for the degree to which they can:

- Improve the coordination of care within the health care delivery system by increased sharing of health information among all authorized clinicians, elevating the standard of care for everyone.
- Provide individuals with electronic access to their own health and wellness information, engaging them in opportunities for improving their health and well-being.
- Improve the health of the community, using aggregated health data for research, public health, emergency preparedness, and quality improvement efforts.

The President of the United States signed Executive Order 13335 on April 27, 2004 to form the Office of the National Coordinator (ONC) for Health Information Technology with the objective of providing electronic health records to most Americans by 2014. Since that time, many efforts have been directed towards how best to equip health care to use and share health information electronically to improve the quality of care and to reduce costs.

As multiple groups grappled with how to achieve the President's vision, the following terms emerged to characterize some of the key building blocks of the envisioned health IT infrastructure: electronic medical records (EMRs) and/or electronic health records (EHRs) for health care professionals, personal health records (PHRs) for individuals and health care consumers, and electronic health information exchange (HIE) to enable efficient communication among these various records. A regional health information organization (RHIO) organizes these components into a local infrastructure.

Discussions around the meaning and dual interpretations of HIE as both a process and an entity brought into focus the need to further clarify differences between the process of information exchange and the oversight and accountability functions of information exchange. A new term, health information organization (HIO), was proposed to describe the oversight function of health information exchange.

While progress is being made toward establishing the envisioned infrastructure, health IT adoption remains relatively low.

- A recent survey conducted by George Washington University, the Harvard School of Public Health, Massachusetts General Hospital's Institute for Health Policy and RTI International, reported the EHR adoption rate for a minimally functional EHR among physicians in the ambulatory setting is only 14%.¹
- Few PHRs exist and many Americans do not know what a PHR is and how it can be of value to them.
- Although standards harmonization and the development of interoperability specifications for use in health IT are being developed, inter-organizational health information exchange is not occurring on a widespread basis.
- Most RHIOs are in formative stages and working to identify viable business models.

These low rates suggest American healthcare culture has yet to embrace the importance and value of health IT. The ONC, recognizing the integral, vital need for clear, consistent language if health IT is to be woven into the fabric of our culture, issued a contract to reach consensus on

¹ Preliminary results were presented on January 22, 2008, to the American Health Information Community

definitions for five health IT terms: EMR, EHR, PHR, HIE, and RHIO. Under the guidance and management of BearingPoint, a management and technology consulting firm, The National Alliance for Health Information Technology (Alliance) conducted a literature review, convened workgroups, and held public forums and comment periods to clarify and create consensus and context around definitions for these terms.

The work contained in this report summarizes the deliberations and conclusions of two work groups, the Records Work Group, which developed definitions for the EMR, EHR and PHR, and the Network Work Group, which developed definitions for HIE, RHIO and, recognizing the need for a term to describe the oversight and governance functions of HIE, named and defined HIO.

The purpose of this report is to present the consensus definitions resulting from the project. To this end, the document has been organized into the following sections:

- An introduction describing the nature of the problem and its implications, the benefits and potential uses of consensus definitions, the scope of the project, and the approach used to develop definitions.
- A discussion of interoperability as the common thread running through health IT terms as a core foundational component.
- A records terms section presenting consensus definitions and rationale to explain the terms EMR, EHR and PHR.
- A network terms section presenting consensus definitions and rationale to explain the terms HIE, HIO and RHIO.
- A look forward, envisioning how the definitions can support an interoperable infrastructure to realize the benefits of health IT.

Acknowledgement of work group members and an appendix of sources consulted during the course of this project are also included.

Identifying the Terminology Problem

Currently, the health IT terminology problem is not a lack of definition for the records and network terms, but rather, the existence of too many differing and even conflicting definitions. When conducting the literature review at the beginning of this project, the number of unique definitions found for each of the five terms ranged from 18 to 63. While there were common elements among some of the definitions, there were also areas of significant divergence. This lack of consistency is reflected in the current health IT landscape. For example, if different stakeholders were asked to define the term PHR, they would each likely come up with a different definition. A physician might define a PHR as a patient's view into components of an existing EHR or EMR, a patient might define a PHR as a stack of papers in the file cabinet at home, and a PHR vendor might define a PHR as a collection of electronic documents detailing the patient's health history. These different perspectives, and the lack of a consensus definition, make it difficult to have discussions on developing policies for, and technical standards around, PHRs.

Similar problems exist with the network terms. Some view the term HIE as the process of exchanging health information electronically, while others view the term HIE as the technical organization operating the network. Still others view the term HIE as an organization that governs the electronic exchange of health information. If the term HIE is defined as an organization, then it would need to be distinguished from RHIO. The term RHIO is limited to a specific regional or geographic component but is also used to describe community-based governance efforts.

The widespread adoption and use of health IT will require a cultural change whereby members of the general public recognize the value of health IT and come to expect access to electronic health information for both their providers and themselves. This culture change is dependent on a common understanding of what constitutes health IT and how electronic health information is created, stored, accessed, and used. Eliminating the confusion around the definitions for these terms will result in a number of benefits including:

- Health IT concepts expressed in a language that individuals comprehend.
- Standard terms for policy makers to use when drafting and evaluating policies.
- Important reference points for health IT initiatives.
- More effective contracting between health IT vendors and their customers.

These definitions will not, and are not intended to, solve all the challenges facing health IT adoption. However, they do represent a valuable foundational piece for beginning to address some important adoption issues.

PROJECT SCOPE

The scope of this project was to gain consensus on definitions for three records terms -- EMR, EHR, and PHR -- and two network terms -- HIE and RHIO. Definitions for these terms were developed in a health IT context; as such, the scope of the records terms has been limited to electronic records. The project acknowledges that many medical and health records exist in paper form, but incorporating the concept of paper records into these definitions was treated as out of scope.

During the course of evaluating the network terms, it became clear there was confusion over the dual use of the term HIE as both the process of electronic health information exchange and the organization supporting electronic health information exchange. As such, the report recommends that health information exchange (HIE) refer only to the process of electronic health information exchange. There is a recognition that HIE requires oversight to facilitate and govern the exchange of health-related information among organizations according to agreed upon standards, protocols and other criteria. A new term, Health Information Organization (HIO), was identified and defined to address this need. An HIO can take different forms, from a geographically based multi-stakeholder governance organization (a RHIO) to a contract/ business agreement or other structure that codifies decision-making authority.

In understanding the scope of this project, it is also important to consider the basic components of a good definition. The project team utilized a professional lexicographer for this purpose. Throughout the report, there has been a consistent attempt to make the definitions clear, concise, and in keeping with good defining practice: that is to say, the definitions must answer the question "what is it?" in a clear, simple and straightforward way. To this end, the following guiding principles were followed:

- Build upon existing definitions whenever possible.
- Increase the clarity and uniform understanding of key health IT terms.
- Be policy-neutral.
- Provide authoritative guidance.
- Develop definitions that are self-contained without reference to external sources.
- Incorporate flexibility into the definitions to accommodate future changes.
- Clearly indicate where we are describing what a term is today versus what it may become tomorrow.

It is important to understand what the definitions are not intended to do. While the definitions provide common language for working on important health IT issues that may lead to broader adoption, higher quality, or more efficient health care delivery, the definitions themselves will not produce these results. They describe several health IT foundation components as they are now, and as they may evolve in the future. The supporting text introducing the definition for each term and the discussions following the definition for each term address some of these broader relationships and implications.

These definitions were developed from a policy neutral perspective. The records and network terms may provide a foundation piece for policy discussions, but they are not intended to promote a particular agenda. There are many challenging policy issues related to these terms such as:

- Confidentiality, privacy, and security of patient data.
- Rights of access, permissions, and appropriate uses of patient data.
- Health information organizations and health information exchange funding and reimbursement models.
- Health Information Organization business and sustainability models.

The issue of what constitutes a provider's legal record was raised in the work group meetings. A legal record is understood to meet specific business needs for care, reimbursement, and disclosure; follow regulation and rules promulgated by Federal, State, or accrediting entities; and contain information as defined by the provider organization. As the health care system moves to adopt electronic records, what serves as a legal record becomes more complex. The data in a provider's electronic record on an individual patient is created and stored in different settings and in different formats, depending on the nature of the data. How these and other issues related to the legal nature of the electronic health information in EHRs and EMRs are currently being discussed in other settings and are therefore not addressed in this report.

It is important to understand for the purposes of this report the difference between an electronic record system and the underlying record itself. The underlying record consists of the health-related information on individuals that is available to be used for informing and improving health care and wellness activities. The record system supplies and performs the functions enabling information in the record to be used for various purposes. The scope of definitions in this report is limited to the underlying record, its content and characteristics. These definitions are not intended to be detailed functionality specifications for electronic record systems. Standards development organizations serving the health care field are conducting work in this area.

In all the records definitions - EMR, EHR and PHR - the content is described as health-related information, and in all the network definitions - HIE, HIO and RHIO - the content of exchange is described as health-related information as well. Health-related information encompasses health, wellness, administrative data, and information derived from public health and scientific research. It includes past and present observations and facts documented in the provision of health care that may be related to preventing illness and promoting wellness or that may be used in the process of informing consent.

Finally, in developing consensus definitions for broad use, it is important to avoid being too prescriptive. The definitions in this report have been intentionally developed at a broad level for general use over time.

ESTABLISHING AN APPROACH

The approach to developing consensus definitions is modeled after the approach used by the Alliance in 2005 to develop a consensus definition for the term "interoperability"². This definition is cited in current federal Stark and Anti-kickback regulations. The approach involves conducting research, framing the issues, and reaching out to a broad spectrum of health IT stakeholders to reach consensus on definitions. Arriving at consensus on the records and network terms involved the following process:

- Conducting a literature review.
- Forming work groups to further the understanding of each term, gain consensus on definitions and evaluate public comments.
- Holding public forums and public comment periods.

² In health care, interoperability is the ability of different information technology systems and software applications to communicate, to exchange data accurately, effectively and consistently, and to use the information that has been changed. The National Alliance for Health Information Technology, July 2005, *What is Interoperability?*

Literature Review

Prior to assembling work groups, the Alliance conducted a literature review to identify definitions already created and in use for the records and network terms. These definitions, drawn from leading organizations across sectors of the health care community, were collected, compared and contrasted. As a result of this research, a number of unique definitions were identified for each term as summarized in the table below.

Table 3: Unique Definitions

Health IT Term	Number of Organizations Identified as Having Meaningful Information about the Term	Number of Unique Definitions Identified for the Term
Electronic Health Record	99	63
Electronic Medical Record	35	26
Personal Health Record	52	36
Health Information Exchange	25	20
Regional Health Information Organization	21	18

The research results were compiled into a discussion document, establishing a factual basis for initial work group deliberations. The discussion document identified the following for each term:

- The most common definition in use today.
- Among definitions reviewed, the most common elements and most substantive differences.
- A discussion of terms and preliminary issues for the work groups to address.

Appendix A lists the organizations and sources researched for that compilation.

Work Groups

While the literature and analysis of similarities and differences among existing definitions were being compiled, two work groups were chartered to develop a more thorough understanding of each term and to champion consensus on the definitions: a Records Work Group for the records terms and a Network Work Group for the network terms. The work group formation process consisted of a public solicitation for nominations. Work group members were selected based on previous experience, expertise and availability to participate in meetings. A conscious effort was made to select work group members representing a broad cross section of health care stakeholders (e.g., payers, providers, consumer advocacy representatives, the government sector, employers, vendors, non-profits). A complete list of Records Work Group and Network Work Group members can be found in the Acknowledgements Section.

The work groups held their first meetings November 30, 2007. Work group members used the literature review discussion document as a starting point for their work and held a series of biweekly meetings to assess the terms, their definitions, their relationships, and their implications. Each work group member contributed expertise and shared work-in-progress with peers and colleagues in order to bring those additional comments to the work group. The deliberation process was designed to determine three basic characteristics of each term:

- What it is.
- What it is not.
- How it differs from the other terms.

Early in the work group deliberations, it was agreed that the definitions were intended for three main constituencies: non-technical leaders in health care delivery, policymakers with responsibility and accountability for decisions in the area of health IT, and members of the general

public who are being asked to participate more fully in their care and wellness activities but need education and tools to do so.

Public Forums and Public Comment Periods

The intent of the public forums and public comment periods was to give the broader public and interested stakeholders an opportunity to respond to the definitions as they were being developed. Public forums consisted of in-person meetings, whereby the definitions were reviewed and discussed.

Table 4: Public Forums Summary

Location	Date	Terms Discussed	Number of Attendees
Washington, DC	01/16/08	EMR, EHR, HIE, and RHIO	52
Orlando, Florida	02/26/08	EMR, EHR, PHR	25
Orlando, Florida	02/27/08	HIE and RHIO	32

Press releases, listserv announcements and outreach notices to stakeholder groups were broadcast to announce each public comment period. Draft reports were made available for download on the project website (www.definitions.nahit.org) and responses were submitted electronically to the website as well. During the first public comment period, 28 comments were received. During the second public comment period, 75 comments were received. The respective work group reviewed each comment, and the disposition of these comments is reflected in this report.

The definitions presented in the following sections of the report are the cumulative result of the literature review, work group deliberations, public forum and public comment periods, and the lexicographer review. The presentation for each term consists of three parts:

- An overview setting each term in a broader health care context, positioning it in relation to the other terms.
- A concise definition that communicates the essence of the term and differentiates it from the other terms.
- A narrative that lays out the core conceptual (not technical) attributes of each term and describes its meaning to create a more complete understanding of the definition.

THE CENTRAL ROLE OF INTEROPERABILITY

A common thread running through the health IT terms is the essential need for interoperability of health-related information. A goal pursued through the work of ONC is for electronic records to support the nation's transition from a provider-focused to a patient-focused system of health and care, the result being the ability to tap into many sources where information on an individual is kept under stewardship. Current ability to access multiple sources of information is restricted by at least two shortcomings: low rates of health IT adoption within the delivery system leading to limited opportunity to create and share health-related information electronically, and relatively few recognized standards for exchanging information reliably and securely, regardless of where the information originates or is being sent or received.

However, the health care field is beginning to facilitate agreement on, and induce adoption of, standards to enable interoperable exchange of information. The following definitions for electronic records and health information exchange acknowledge this process of facilitating interoperability by requiring the use of these standards as availability increases. Specifically, the definitions require the ability to use "nationally recognized interoperability standards," referring to a recognition process established by the Secretary of Health and Human Services (HHS). A principal source of standards for the Secretary to officially recognize is the American National Standards Institute's (ANSI) Healthcare Information Technology Standards Panel (HITSP), the federally supported body set up to harmonize interoperability standards. These standards are developed by a number of national and international standard organizations.

Until HHS recognizes a body of standards approaching the critical mass that enables a working level of interoperability, any definition that includes interoperability as a characteristic describes something that is currently very limited in its capacity to exchange health information. However, in order to arrive at the level of sophistication required of EHRs, interoperability must be a pivotal characteristic. And in order for EHRs to draw information from many sources through health information exchange, those networks of exchange must also be capable of using interoperability standards. Thus, electronic records and information exchange processes must be ready to use the increasing number of recognized standards as they become available.

A factor in the staged adoption of interoperability standards is the certification process for health IT products established by the Certification Commission for Healthcare Information Technology (CCHIT). In addition to developing minimum criteria for functionality, security and privacy features of EHRs, the CCHIT certification process requires health IT products to demonstrate they have incorporated the nationally recognized interoperability standards.

The combination of standards development efforts, formal recognition of nationally recognized interoperability standards, and phased implementation of standards into health IT products provides the basic foundation for electronic records and health information exchange to bring about a patient-focused system of health and care. The definitions presented here rely on this foundation.

HEALTH INFORMATION TECHNOLOGY TERMS

Health Record Terms Introduction

Electronic records have progressed during the past few decades as a useful alternative to paper-based records. Many types of health care organizations, from physician offices and hospitals to behavioral health and long-term care facilities, among many others, have and continue to realize benefits from creating digital versions of patients' paper charts. Sharing the patients' information across the organization and analyzing and interpreting information on a single patient or groups of patients is immensely valuable.

In transition. Current electronic record usage is primarily centered on the needs of authorized clinicians and staff for information regarding the patients treated within their organization. However, individuals seeking health care services typically go to many care providers who are not affiliated with one another. Each provider organization creates a separate record for the patient's care experiences. Without the ability to view multiple records on an individual from the multiple places where records are created, clinicians have an incomplete view of the available information that could well influence diagnosis, prevention and treatment.

The solution being pursued in health care is to enable the aggregation of health-related information into one record focused around a person's comprehensive health history rather than around one provider's limited view of that history, and to authorize access to that record wherever and whenever a person receives care. To accomplish this higher level of information aggregation and sharing, all the contributing organizations must be able to send and receive information using standards that facilitate the interoperable exchange of health-related information. Electronic records capable of employing such standards for interoperability, therefore, are pivotal to achieving patient-focused organization of health-related information. Electronic records that do not have this capability will be limited in their ability to keep pace with the future direction of health care.

The difference is interoperability. This distinction between records according to their ability to exchange information interoperably is the principal difference between an EHR, which can exchange information interoperably, and an EMR, which cannot. The EMR as defined in this report aligns with the prevailing state of electronic records today (whether they are branded as an EMR or an EHR). However, the movement of the industry is toward electronic records that conform to recognized standards for interoperability, which are defined as EHRs in this report. With the passage of time, electronic records that are not capable of exchanging information interoperably will lose their relevance. Thus, the term EMR is on a course toward eventual retirement, leaving EHR as the sole term referring to records of health-related information in electronic form that can be exchanged by health care organizations.

Engaging the individual. Paralleling the movement to patient-focused EHRs is the growing momentum to encourage individuals to be active participants in their health and care by giving them the means to establish and manage their own electronic store of health-care and wellness information. This personal health record, or PHR, is defined in this report in terms of an emerging state, the objective of which is to encourage individuals to pursue healthful lifestyles, manage health risks and chronic illnesses, access health and wellness services, and make more informed decisions.

In summary, EMRs and EHRs are tools for providers while PHRs are the means to engage individuals in their health and well-being.

Table 5: Electronic Health Records Definitions

Electronic Medical Record	Electronic Health Record	Personal Health Record
An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization.	An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one health care organization.	An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be drawn from multiple sources while being managed, shared, and controlled by the individual.

What is an electronic medical record?

Overview

In every individual health care encounter, clinicians have the need and responsibility to collect, retrieve and analyze data in the course of his or her attention to a patient. With the advent of computer-enhanced health care technologies, the EMR has come to represent the digital version of a patient's paper chart within a clinical setting, whether in physician offices or in hospitals or other care facilities where these activities are documented. It is expected that the information contained in an EMR be maintained in a secure manner that protects the confidentiality of the individual's information.

In addition to creating, storing and sharing information from within the health care organization it serves, an EMR can transmit and receive health-related information to and from external sources. But, it does not have the inherent capacity to use nationally recognized interoperability standards to send and receive, which distinguishes it from an EHR. Many options exist to send and receive by proprietary means: a lab issuing test results to a provider's designated computer, for example, or a data interface enabling a hospital to report a disease outbreak to a health department. Information also can be entered manually or scanned in from faxes, phone messages or paper-based reports. Various functionalities may permit an EMR to aggregate data points that have been entered, but they do not take advantage of standards-based interoperable data.

Because of this lack of interoperability, an EMR is limited to one health care organization. This does not mean a single physical location; under some circumstances, information can be shared among multiple facilities and still be within one EMR. For example, an electronic record used in a physician practice with several offices (intra-organizational) is still an EMR when all sites are using the same proprietary data structure and architecture and the information is not moving outside the confines of the organization using nationally recognized interoperability standards.

The scope of this definition is limited to the content and characteristics of the underlying record, not on the systems that perform functions enabling data in the record to be used for various purposes. Thus it is different from, and cannot be equated with, establishing detailed functional standards or criteria.

Electronic Medical Record (EMR)

An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization.

Understanding an EMR

The EMR's structure as a store of electronic information capable of being searched, categorized and analyzed makes it superior to the traditional paper chart for informing the care process. Nevertheless, proceeding from its historical basis as the digital version of a patient's chart, the EMR is a provider-focused view of the patient's health history. It comprises health-related information that is created by clinicians or that results from clinician orders and activity on behalf of a patient, such as diagnostic tests or prescriptions for medications. A main objective of an EMR is to improve the ability of a clinician to document observations and findings and to provide more informed treatment of persons in his or her care.

An EMR also can provide the underlying patient information for computerized functions such as drug-to-drug interactions, recommended care practices or interpretation of data to support and improve clinical decisions. However, these functions are limited by the extent of the information available in a provider-focused electronic medical record within a single health care organization.

What is an electronic health record?

Overview

The electronic health record (EHR) is the focus of efforts throughout the health industry to employ the most comprehensive information available to best inform the care delivery process. The definition recognizes that health-related information about a patient is available in multiple locations and systems and that, if presented through a common and user-friendly interface, this information can improve the ability of clinical personnel to support the best possible diagnosis, treatment, and health management decisions for and with an individual.

The ability to aggregate comprehensive information, whether physically within one record or virtually from records in multiple locations, is currently limited. Technical standards and common vocabularies for medical terms have yet to be agreed upon let alone implemented for many different types of data originating from many diverse sources. The potential for digitizing information and thus making it available to all involved in health care will improve over time, in step with progress in the interoperability of information and the increased adoption of EHRs within the delivery system.

In the past, a person's medical history was recorded primarily to document how clinicians in a single care organization treated that person's health needs during a clinical encounter. EHRs will help health care providers move to a more efficient way of organizing and sharing information beyond the scope of one organization or single encounter. EHRs take advantage of advances in computer performance and electronic communication to present a patient-focused view of an individual's health information recorded by various provider facilities—such as physician offices, hospitals, long-term care facilities, behavioral health centers, home-based care, laboratories and pharmacies—and authorized clinicians, such as physicians, nurses, social workers and others involved in an individual's care.

EHRs will allow the recorded narratives, newly added observations and test results for a patient to be brought together from multiple settings and locations of care providers into one health record. In addition, information from administrative sources may also be included, such as: claims data from health plans; formulary and medication data from pharmacy benefit managers, and demographic data. It is expected that the information contained in an EHR be maintained in a secure manner that protects the confidentiality of the individual's information.

The scope of this definition is limited to the content and characteristics of the underlying record, not on the systems that perform functions enabling data in the record to be used for various purposes. Thus it is different from, and cannot be equated with, establishing detailed functional standards or criteria.

Electronic Health Record (EHR)

An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one health care organization.

Understanding an EHR

An EHR is patient-focused in that it is not limited by what a single provider organization is able to accumulate on behalf of a patient under its care. Through the capabilities of interoperability, an EHR becomes an authorized means to access information from whatever sources have chronicled the health care experience of a patient over time. The boundaries of an EHR are built not around the organization documenting the information but around the patient and his or her health-related information. Though it is patient-focused, it is managed and used primarily by

authorized care providers, as well as by members of their staff who have a need to access the EHR to support the process of care.

Cradle to grave. As the information in an EHR is drawn from multiple organizations, the envisioned goal is for it to be a comprehensive, longitudinal record of an individual's pertinent health history. Due to the depth and breadth of data, an EHR thus offers a perspective on changes in health and medical conditions over time.

Information richness. Examples of information that can be contributed to and accessed in an interoperable EHR include:

- Past and current clinical information incorporated from all organizations that have been engaged in an individual's care or health maintenance.
- Administrative information pertinent to making clinical judgments and cost-sensitive decisions. One example is the multiple formularies used to select medications based on a patient's insurance benefits.
- Population-based data from sources such as disease registries and initiatives to detect disease outbreaks.
- Information that can be interjected into a clinical situation or used to interpret data on an individual to support and improve clinical decisions. Examples include alerts about harmful interactions of one drug with another, and formulas for medication dosing based on patient-specific conditions such as diabetes and factors such as age and weight.
- Information on evidence-based medicine, scientific research studies, or environmental situations.
- Information from remote monitoring devices, which capture real-time data on vital signs, cardiac or respiratory status, lab test values, etc.
- Information provided by PHRs, including patient-entered documentation, to supplement and enhance knowledge of a person's health status and initiative.

EHR or PHR? Through various technological means, selected content in an EHR can be made available for individuals to view and use in guiding activities of health and wellness through what is called a "patient portal." The health care provider operating the EHR system typically controls the portal. Many of these portals are given the name PHR, but the source of control of the information is important in determining whether this model is a PHR or remains within the scope of an EHR. To be a PHR, access to the record must be managed and controlled by the individual. Information that passes from an EHR to a PHR transfers to the control of the individual.

What is a personal health record?

Overview

The growing importance of the participation of individuals in their own care and wellness activities is the impetus behind the vision for personal health records. By enabling and encouraging individuals to become more engaged in their health and care, and by providing the means to document, track and evaluate their health conditions, a PHR can lead to more informed health care decisions, improved personal health status, and ultimately, reduced cost and improved quality of health care.

The current and largely rudimentary manifestations of what some call PHRs in electronic form begin to address personal health management objectives by providing some information on health care services and allowing individuals to enter information. Yet, PHRs have the potential to be a robust, better-assembled and more organized source of both clinical and wellness information for an improved level of clinical, health and wellness decisions. The anticipated result is a well-rounded, complete picture of an individual's health that extends beyond the care provided by the delivery system. Given the longitudinal nature of a PHR, the time period for this information could conceivably be as long as "cradle to grave."

Though a portion of the information in a PHR may originate from health care providers, health insurers or third party administrators, the control of information transfers to the individual when it becomes part of the PHR. By contrast, current internet-based portals of information on an individual that are hosted and maintained by a provider or payer organization, without transferring access and control and use of the information to the individual, are not considered PHRs based on this definition.

Personal Health Record (PHR)

An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be drawn from multiple sources while being managed, shared, and controlled by the individual.

Understanding a PHR

The most salient feature of the PHR, and the one that distinguishes it from the EMR and EHR, is that the information it contains is under the control of the individual. The concise definition above names the individual as the source of control, but that leaves room for others acting in the individual's interest—their agent or agents—to have control over access to the PHR. An agent may be expressly designated by the individual but not in all cases; examples of an agent acting for an individual include parents acting for children, or, in the later stages of life, children acting for parents.

Exercising control. The individual is distinctively the guardian of information stored or accessible within a PHR. Similar to the role of a librarian, a person managing a PHR decides what volumes of information to include, how they are maintained and ordered, and who can read them or "check them out." Standards and policy will need to determine if and how individuals can delete or modify information in a PHR that originated from an EHR and how these modifications are communicated to other providers with whom the data in the PHR are shared.

Portability. Having control also means that an individual's PHR can exist independently of the entity that sponsors it—the PHR is portable. This requirement for portability excludes models in which sponsors such as health insurers or health care providers give individuals access to health-related information that is dependent on the individual remaining with that sponsor.

Inputs into the store of information.

To reiterate, the long-term goal of a PHR is to be a lifelong resource of pertinent health information for an individual. Thus it should have both the depth and breadth of information to enable individuals to become more engaged in their own healthcare as they move from being passive recipients to active participants in their personal health management. The health information in a PHR can be drawn from a broad range of possible sources. Significant sources may include, but are not limited to:

- **Health care providers**—Including hospitals, skilled nursing homes, long term care, and other facilities; pharmacies, lab, and diagnostic facilities reporting test results.
- **Health care clinicians**—Including physicians, nurses, behavioral health professionals, registered dietitians, chiropractors, and other licensed or certified care providers.
- **Medical devices**—Instruments, machines and implanted devices monitoring clinical indices, for immediate use as well as for historical purposes.
- **Wellness promoters**—Entities supplying services or information to generate and maintain good health, such as fitness centers, rehabilitation experts, and complementary/alternative medicine practitioners.
- **Individuals**—Self-generated information for personal management or information for care providers, including information about allergies, prescribed medications, eating habits, exercise objectives, the progression of an illness or recovery from it, and preferences regarding care in various circumstances.
- **Health insurers**—Information arising from claims for insurance payments, disease management programs recommending certain actions and collecting results, updated information on drugs in a formulary, and other coverage policies specific to an individual.
- **Public health**—Government health departments, disease surveillance and immunization programs, school-based care providers and social workers, and nongovernmental organizations engaged in health and wellness.
- **Research institutions**—Information about opportunities to engage in clinical trials and studies, and recently published results of interest to the individual.

The sum of these and other inputs is a well-rounded picture comprising clinical information, administrative information, and wellness information for individuals to employ and impart to others at their discretion.

Health Network Terms Introduction

Networks for exchanging health related information are essential to aggregating patient-focused information into EHRs and PHRs as well as to developing a population-based approach to improving care practices and preventing illness. These networks are beginning to take shape in localities and regions around the nation, and there is a need to enable these networks and their participants to exchange health-related information electronically on a widespread, interoperable basis with appropriate privacy, security, and confidentiality safeguards in place.

Nationally recognized interoperability standards are a necessary component of the definitions for the records terms. However, the network terms require interoperability plus an additional set of nationally recognized standards to enable the flow of information reliably, consistently, accurately and securely. This concept is reflected in the definitions.

The terms that facilitate understanding of the concepts closely associated with building health information exchange networks must address two principal components of a network endeavor:

- The process of sharing health-related information using nationally recognized standards.
- The need for an oversight structure to facilitate this sharing of health-related information and to be accountable for its performance.

The two terms under examination for their role in describing information networks—HIE and RHIO—address these two components, but further clarification is needed.

Eliminating Confusion. As an oversight structure, a RHIO describes a certain type of arrangement with distinct attributes relating to governance and geography. But it is not adaptable enough to suffice as a term that can encompass the wide range of organizational forms that an information-sharing structure can take, including forms yet to be envisioned. This shortcoming has led to the increasing usage of the term HIE to represent an oversight structure with the requisite flexibility. However, the term HIE at its core describes the process of sharing information. Continuing its dual meaning as the oversight structure as well as the process perpetuates confusion over the term, which runs counter to the objectives of clearly assigning meaning to each term and distinguishing one term from another in discussions about health information technology.

Proposed new term. Drawing from discussions in the Network Work Group and comments received in public forums and written public comments, two possibilities emerged and were considered; both of them are adaptations of existing health IT terms:

- Health information organization (HIO), identifiable as the root element of RHIO without the boundaries of geography assigned by the use of the modifying word *regional*.
- Health information exchange organization (HIEO), identifiable as the organizational entity that undertakes the oversight and governance of the HIE process.

Each alternative had significant support. In the final stage of consideration, consensus developed around HIO as more straightforward and distinguishable from HIE. HIO also lends itself to being the overarching term to describe an organization while having the built-in capacity to include a modifier for more specific identity: state-level, pediatric, behavioral, etc. It embraces RHIO as one kind of HIO while opening up the opportunity for other HIOs that are not geographically based.

Table 6: Network Terms

Health Information Exchange	Health Information Organization	Regional Health Information Organization
The electronic movement of health-related information among organizations according to nationally recognized standards.	An organization that oversees and governs the exchange of health-related information among organizations according to nationally recognized standards.	A health information organization that brings together health care stakeholders within a defined geographic area and governs health information exchange among them for the purpose of improving health and care in that community.

What is health information exchange?

Overview

Health information exchange (HIE) refers to the process of reliable and interoperable electronic health-related information sharing conducted in a manner that protects the confidentiality, privacy, and security of the information. Essential to this process is the capability to employ nationally recognized standards as they are established incrementally, further enabling interoperability, security and confidentiality of the information as well as authorization of those who access the information.

Networks that are self-contained, such as those linking a hospital to affiliated practices, to other hospitals in an organization or to labs, can exist without having to employ nationally recognized standards. In the case of networks that make the exchange of information possible solely through proprietary means, the process is not considered HIE under the definition below. HIE at minimum must be technologically ready to conform to nationally recognized standards as they are available.

HIE supports the sharing of health-related information to facilitate coordinated care through the utilization of EHRs. HIE also provides key information to individuals to promote health and wellness through population of PHRs, and can be used to support research, public health, emergency response, and quality improvement. In addition, HIE enables the sharing of health-related information among health care organizations and with individuals on a local, regional, and national basis. This interplay of electronic records and health information exchange is an important component in establishing the basics of an infrastructure that will become the Nationwide Health Information Network (NHIN).

Health Information Exchange (HIE)

The electronic movement of health-related information among organizations according to nationally recognized standards.

Understanding HIE

To act as the medium of interoperable exchange between electronic records and organizations, HIE must itself meet nationally recognized interoperability standards. In addition, other classes of standards enabling the flow of information safely, consistently, accurately and securely must be part of the requirements for HIE. Interoperability, security and other standards required for HIE are in various stages of being developed and recognized by HHS. The definition of HIE includes readiness to use these developing information exchange standards; these standards for interoperability and information exchange, used consistently in HIE, will contribute to the foundation of what will become a Nationwide Health Information Network (NHIN).

HIE is not bound by geography—it can tie together sources of data from anywhere, whether within a small area or scattered throughout the nation. HIE can bring together a national network of labs, the network employed by entities representing disease communities, or an organization that facilitates the electronic prescribing of medications, etc.

What is a health information organization?

Overview

The process of HIE requires a formal degree of oversight to facilitate and govern the exchange of health-related information between organizations. The first incarnation of this oversight function to emerge from the marketplace was the *regional* health information organization or RHIO. But as different business and technological arrangements came into being to foster exchange of health-related information, they did not fit well into the confines of a RHIO as it was becoming defined by such characteristics as geography and community-based governance. To effectively account for and describe the range of possible organizational types, a term to uniquely define oversight organizations is necessary.

The term HIO affords an opportunity to be as general or specific as desired when referring to the arrangements governing the exchange of health information and identifying the nature of participation. As one result of this approach, the term RHIO can be placed in its proper perspective and defined distinctly. Thus a RHIO is positioned in this report as a type of HIO with a well-defined purpose and participation, one among many other potential types of HIOs with different purposes, participants and contractual agreements. Examples of other types of HIOs include health data banks, specialty care organizations, and integrated delivery networks (IDNs). Other types of HIO organizations can, if desired, differentiate themselves by substituting another defining word and acronymic letter ahead of the root term HIO.

Health Information Organization (HIO)

An organization that oversees and governs the exchange of health-related information among organizations according to nationally recognized standards.

Understanding an HIO

The purpose of an HIO is to perform oversight and governance functions for HIE. Oversight functions of an HIO may include, but are not limited to:

- Facilitation of operations associated with the movement of information—assuring that hardware, software, protocols, standards, stakeholders and services supporting the interoperable exchange of health-related information are available and engaged.
- Fiduciary responsibility for the assets, accountability for abiding by regulatory requirements for handling personal health information, and adherence to standards enabling interoperable information exchange.
- Maintenance of information sharing agreements, business associate agreements, or other such contracts.
- Adoption and maintenance of standards ensuring interoperability while protecting the confidentiality and security of the information.
- Making decisions regarding certain types of information for which no nationally recognized interoperability standard is available.
- Developing and sharing best practices among organizations.

Although an HIO is identified as the organization overseeing HIE among disparate entities, HIE can also be implemented within a single organizational structure—for example, an integrated health care delivery system that converts from a proprietary, non-standard information exchange architecture to HIE architecture using nationally recognized standards. The health care system benefits by being in a position to exchange health-related information with other HIOs as they develop and mature.

What is a regional health information organization?

Overview

A RHIO is first and foremost a governance entity whose purpose is to facilitate the accessibility and exchange of health-related information on individuals within a contiguous geographic area for the benefit of the community in that area. A RHIO exists to supplement and enhance efforts to improve the quality, safety and efficiency of health and care on behalf of the individuals within its delineated geographic area. In essence, a RHIO is a type of HIO that is mission-driven and geographically bound.

Prominent entities in a RHIO include those that create and maintain health-related information and may include any organization, individual or interest group with a stake in improving health care through efforts to make health information more widely available, using appropriate security measures to protect the privacy of individuals as well as the confidentiality of their information.

Groups of stakeholders may include:

- Health care institutions and personnel that render care.
- Businesses and government agencies that reimburse for those services.
- Researchers and professionals who are engaged in health improvement activities.
- Public health agencies.
- Consumers of health care.

HIE within a RHIO's geographic area is the chief means by which its objectives are achieved. The RHIO enables, facilitates and fosters collaboration among stakeholders to attain a useful level of information sharing through HIE. A RHIO may operate directly or contract for HIE services.

Regional Health Information Organization (RHIO)

A health information organization that brings together health care stakeholders within a defined geographic area and governs health information exchange among them for the purpose of improving health and care in that community.

Understanding a RHIO

To be designated a RHIO, an entity needs to have certain core features. These attributes distinguish it from other organizations that do not or cannot execute the distinct purpose and responsibilities of a RHIO.

An organization designated as a RHIO:

- Must involve data-sharing participants that are separate and distinct legal entities operating within a defined geographic area whose collaboration through the RHIO will cross organizational boundaries.
- Must intend to benefit the population in the community. This requires that stakeholders come from the defined geographic area and that the RHIO provides well-defined and transparent processes to facilitate the interoperable exchange of health information across the range of participating stakeholders.
- Must be inclusive and convene various types of stakeholders in the delineated geographic area who are vested in improving the health of the community.
- Can arrange for the provision of additional technical and operational services supporting its primary purpose. Such services may vary based on stakeholder needs and a range of environmental factors. Examples include:

- The technology and support for physicians to create and use electronic records, delivered to their places of work through Internet connections by application service providers (ASPs).
- Electronic exchange of messages in a secure format to report and distribute medical test results.
- Data on specific patients to first responders in a community; for example, whether a patient has signed a DNR (do not resuscitate) order.
- Coordinated electronic health record and personal health record platforms for the region.

The “regional” in RHIO defines a variable area that is less than national but can be broader than legislative boundaries (i.e. state lines, city limits, etc.) This latitude allows the determination of geographic boundaries logical to a set of stakeholders seeking to pursue the objectives of a RHIO. A RHIO can be organized to support a community, groups of communities, a statewide area or a region crossing state boundaries.

However, not all organizations with a geographic identity that are established to oversee and govern HIE must define themselves as RHIOs. For example, state-level HIOs that coordinate the consistency of information protocols, business rules and other components of RHIOs within the state do not have to meet the special requirements of a RHIO just because they are defined by the geography of a state. Their mission, objectives and manner of participation can be factors defining a different sort of HIO classification.

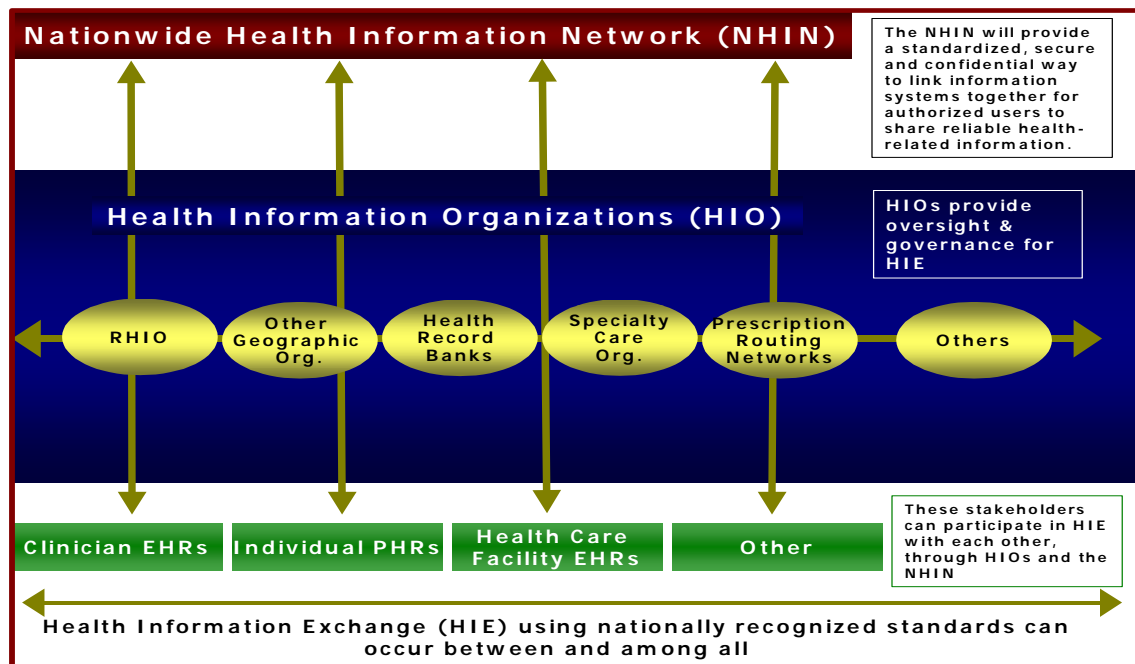
HEALTH IT ENABLED HEALTH AND CARE: THE FUTURE

Health care visionaries foresee a time when all types of health-related information exist electronically and can be reliably and securely accessed by any number of authorized parties and entities to improve the health of an individual, a specific community, or the U.S. population as a whole.

The integration of electronic records that can communicate with each other, governance and oversight organizations, and health information exchange processes will establish a larger and fully connected infrastructure to support all aspects of health and care.

The question then arises as to how current work supports this vision, and where this vision might take us. The following is a graphic representation of how the components of the proposed infrastructure integrate.

Diagram #1



While electronic records of health information are distinct entities now, it is clear that at some point in the future, data within them could meld, and various portals or views to the information would be developed to support the needs of providers, individuals, researchers, public health, and others engaged in health and wellness. This will bring additional benefits we can only imagine today, such as:

- **Personalized health care.** Rich information of this type would expand research capabilities to a level of patient specificity not currently possible. Diagnostic options and treatments could then be tailored to each individual's characteristics, genetic makeup, and preferences.
- **Knowledge management.** The ability to assimilate and present the results of both empirical and traditional research in a far more timely fashion than is currently available would assure the accessibility of more evidence-based care appropriate to the circumstance.

- **Expectation of quality.** Dissemination and integration of the best knowledge available into systems that present the information in timely and useable formats would assure each individual that he or she is experiencing the highest quality of care we all will come to expect:

The vision starts today

The beginnings of this new era are not in the distant future. The Secretary of Health and Human Services has recognized a number of interoperability standards that will be included in the 2008 Certification Commission for Healthcare Information Technology certification process. Adoption of certified EHRs among clinicians and hospitals is expanding. Certification of interoperable PHRs is expected by 2009. Health information exchange standards have been formulated and are currently being implemented in nine trial sites of the Nationwide Health Information Network and within the Federal government. The process of adding nationally recognized interoperability standards is ongoing in HHS. These activities underscore the importance of defining and understanding the components of the emerging network for information sharing and how they will work together.

2008 is a pivotal year for health information technology. Adoption of the proposed common language will support more widespread adoption of the critical components necessary to transform our fragmented system to one that can support optimal health and care.

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APPENDIX A: REFERENCES - ORGANIZATIONS & LITERATURE REVIEWED

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The Bartlett <http://www.pehrtech.com/products.html>

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