Telemedicine & Health IT

Health Provider		Patient Care

Telemedicine, Telehealth, and Health Information Technology

An ATA Issue Paper

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The purpose of this paper is to provide a tool for ATA members to identify opportunities for collaboration and to better understand the interaction between telemedicine/telehealth services and health information technology (HIT) applications on local, regional and national levels. It presents a framework for discussing the interdependency of both telemedicine and HIT and includes a discussion about ways to leverage the telemedicine community's experience in areas of mutual interest with HIT initiatives. It concludes with several proposed next steps for ATA.

<u>Health Information Technology Initiatives</u>

Over the past twenty years significant progress has been made by the informatics community in developing a systematic approach to health IT. Achievements such as the machine-level communications infrastructures (HL7 messaging, SNOMED, etc) have laid the groundwork for the creation of electronic records and clinical decision support systems. These milestones are vital in the standardization and growth of telemedicine applications.

Today, the federal government has taken on the task of accelerating the deployment of health IT systems. In January 2004, President George W. Bush called for the widespread adoption of electronic health records (EHR) within 10 years. In addition, a federal Office of the National Coordinator for Health Information Technology located within the Department of Health and Human Services (HHS) was established (ONC).

> *"..to link all health records through an interoperable system that protects privacy as it connects patients, providers and payers. Resulting in fewer medical mistakes, less hassle, lower costs and better health."*
> *-- HHS Secretary Mike Leavitt*

The National Coordinator's office is charged with coordinating and promoting the deployment of interoperable electronic health information systems throughout the nation as well as other related health technology initiatives. An interim goal of the office is to have, within one year widely available, secure and standardized solutions for accessing current and historical laboratory results and interpretations deployed for clinical care by authorized parties. As part of this initiative the office has established the American Health Information Community, a federal advisory body, chartered to make recommendations to the Secretary of HHS on how to accelerate the development and adoption of Health IT in four areas:

- <u>Consumer Empowerment</u> - Make available a consumer-directed and secure electronic record of health care registration information and a medication history for patients.
- <u>Chronic Care</u> - Allow the widespread use of secure messaging, as appropriate, as a means of communication between doctors and patients about care delivery.
- <u>Biosurveillance</u> - Enable the transfer of standardized and anonymous health data from the point of health care delivery to authorized public health agencies within 24 hours of its collection.
- <u>Electronic Health Records</u> - Create an electronic health record that includes laboratory results and interpretations, that is standardized, widely available and secure.

In addition to and in coordination with the efforts of the National Coordinator, other federal bureaus and agencies, including HRSA and CMS, Departments of Veterans Affairs and Defense and others, have created or expanded the HIT components/offices within their respective organizations. These expanded efforts reflect a serious commitment to integrating HIT priorities in programs funded by or otherwise supported by these federal agencies.

Moreover, many of the innovations and development of systematic approaches to health IT have been accomplished through the work of health informatics organizations such as HIMSS and AMIA as well as a variety of technical and IT standardization bodies. This work has largely been led by the Chief Information Officers and other HIT and management information system staff located within many healthcare systems. Clinical and related healthcare applications, such as telemedicine has often directly benefited from, but not always been part of, these efforts.

Each of these HIT initiatives has significant and positive implications for telemedicine. Efforts to improve remotely accessible and interoperable information systems are critical for the success of telemedicine. Integration of system-wide electronic records into telemedicine applications will improve both the efficiency and quality of care.

Telemedicine & Telehealth Initiatives

Telemedicine is the use of electronic communications and information technologies to provide clinical services when participants are at different locations. Closely associated with telemedicine is the term *Telehealth*. This term is often used to encompass a broader application of technologies to distance education, consumer outreach, and other applications wherein electronic communications and information technologies are used to support healthcare services. Videoconferencing, transmission of still images, e-health including patient portals, remote monitoring of vital signs, continuing medical education and nursing call centers are all considered part of telemedicine and telehealth.

Within existing healthcare facilities, a few key clinical staff members have often led the development of telemedicine applications. As a result, the initial telemedical services that are offered reflect the clinical specialties of those leaders. Leading examples in the past have included radiology, dermatology, cardiology and pathology.

Telemedicine does not represent a separate medical specialty; rather it is a tool that can be used by health providers to extend the traditional practice of medicine outside the walls of the typical medical practice. In addition, telemedicine offers a means to help transform healthcare itself by encouraging greater consumer involvement in decision making and providing new approaches to maintaining a healthy lifestyle.

Types of Services

The delivery of remote health services is used for a variety of purposes:

♦ Specialist referral services typically involve a specialist assisting a general practitioner in rendering a diagnosis. This may involve a patient "seeing" a specialist over a live, remote consult or the transmission of diagnostic images and/or video along with patient data to a specialist for viewing later.
♦ Direct patient care such as sharing audio, video and medical data between a patient and a health professional for use in rendering a diagnosis, treatment plan, prescription or advice. This might involve patients located at a remote clinic, a physician's office or home.
♦ Remote patient monitoring uses devices to remotely collect and send data to a monitoring station for interpretation. Such "home telehealth" applications might include using telemetry devices to capture a specific vital sign, such as blood pressure, glucose, ECG or weight. Such services can be used to supplement the use of visiting nurses.
♦ Medical education and mentoring, which range from the provision of continuing medical education credits for health professionals and special medical education seminars for targeted groups to interactive expert advice provided to another professional performing medical procedure.
♦ Consumer medical and health information includes the use of the Internet for consumers to obtain specialized health information and on-line discussion groups to provide peer-to-peer support.

Delivery Mechanisms

Remote health care relies of several means for the delivery of data:

♦ Networked programs link tertiary care hospitals and clinics with outlying clinics and community health centers in rural or suburban areas through either hub-and-spoke or integrated networked systems. The links may use dedicated high-speed lines or the Internet for telecommunication links between

sites. It is estimated that there are about 200 telemedicine networks in the United States involving close to 3,500 medical and healthcare institutions throughout the country.

♦ <u>Point-to-point connections</u> using private networks are used by hospitals and clinics that deliver services directly or contract out (out sourced) specialty services to independent medical service providers at ambulatory care sites.

♦ <u>Health provider to the home connections</u> involves connecting primary care providers, specialists and home health nurses with patients over single line phone-video systems for interactive clinical consultations. Such services can also be extended to a residential care center such as nursing homes or assisted living facility.

♦ <u>Direct patient to monitoring center</u> links are used for pacemaker, cardiac, pulmonary or fetal monitoring and related services and provide patients the ability to maintain independent lifestyles.

♦ <u>Web-based e-health patient service sites</u> provide direct consumer outreach and services over the Internet.

<u>The Interrelationship between Health Information Technology and Telemedicine</u>

The goals and activities of telemedicine and health IT are complementary and synergistic. Telemedicine is a method of delivering health care that makes use of health information technologies to accomplish its goals. Conversely, health information technologies (HIT) are an enabling component to the delivery of health services over distances, providing fundamental tools and systems. In short, HIT greatly enhances the utility of telemedicine.

It is also important to acknowledge a distinction – telemedicine is not a *type* of HIT. Certainly telehealth is dependent on the use of telecommunications and related forms of advanced technologies but it fundamentally describes the delivery of patient and consumer care. In some respects the distinction reflects a difference between clinicians and the IT world. It is important that the differences be recognized, understood and accepted so that telehealth and HIT can work together in order to optimize the delivery of health care.

> *The goals and activities of telemedicine and health IT are complementary and synergistic*

The illustration below depicts how the varieties of telehealth and health information applications fit within the larger system of medical care. The base of health information technology supports the deployment and use of electronic health records, administrative applications consumer information services and core clinical services (of which telemedicine is one component in the delivery of those services).

All applications and HIT components are interrelated. For example, the EHR supports the care delivery system in its multiple modes. Telemedicine is facilitated by access to an interoperable EHR that can allow the practitioner to review and evaluate all of the necessary information about the patient prior to and while the patient is being seen. Making use of a fully implemented EHR will improve the quality of care delivered by telehealth mechanisms in the same manner that the EHR will have a general impact on the quality of care in ANY practice modality.

Figure 1. Relationships between HIT and Telemedicine

HEALTHCARE DELIVERY SYSTEM

	Clinical Medical Services	Health & Medical Education	Consumer Health Information
Health and Medical Applications	In-Office Services - - - - - - - *Remote Medical Services*	In-Classroom - - - - - - - - - *Distance Learning*	In-Person - - - - - - - - - *Remote Health Information*

Health Information Technology Components	Electronic Records Management Information Systems Network Management and Device Interface

Areas for Collaboration between Telemedicine and Health IT

The experiences learned from over 30 years of building telemedicine networks and providing remote medical services has provided lessons that are important to understand and build upon in meeting national goals involving HIT. With 200 institutional networks and hundreds of home health and remote monitoring programs in existence, all relying on advanced HIT, the established telemedicine networks contain a rich resource of information.

Over the years, the developers of these networks and programs have built upon their technical configuration and operational protocols to best adapt to existing conditions within their service area and within the participating institutions that are part of the network. Understanding the lessons learned in telemedicine and considering the organizational and technical decisions that have been made and that led to success is important. There are four key areas of expertise and remaining need that have evolved over the years.

1. Establishing and maintaining networked, organizational relationships

Many telemedicine networks have required multiple independent entities to work together toward a common goal of providing healthcare. The developers of telemedicine networks have had to negotiate inter-organizational agreements to address such issues as governance, fiduciary responsibility, and oversight in an environment where there are multiple, equal partners, much like the anticipated structure of Regional Health Information Organizations (RHIOs) or other health information exchange organizations. Telemedicine networks have had to focus on building trust relationships among institutions, practitioners and patients that will allow the delivery of care by a physician at another institution. Many times the physician/patient relationship exists between distant geographic locations where the provider and patient are located in separate institutions when they have never met face to face.

Most hub and spoke telemedicine networks are built following natural alliances and do not always follow normal geographic boundaries. The relationships often start with the contour of established patient referral networks and institutions that are not competing for patients, using the network to accommodate patient referrals and paying for services through reimbursement, contracts, grants and health system underwriting. Several successful telemedicine networks have created a grid of all major health

institutions (usually within a defined geographic boundary), wherein the network is managed as a basic, shared infrastructure, allowing any node on the network to connect with any other user on the system without penalty and paying for the network through membership fees, contracts and grants. Both types of networks are built on a critical understanding of the existing political and economic structure of the health care system in the region and has been fundamental to the success of many telemedicine programs

Potential Areas of Collaboration: Networks already established for telemedicine should be used as the initial test beds and role models of mechanisms to exchange health information (e.g., RHIOs), taking advantage of already established networks for providing clinical care as well as using already established secure, high bandwidth networks for other health technology applications. At the same time, the development of regional approaches to creating uniform patient health records and a unified billing system is critical to fully realizing the benefits of remote clinical services.

2. Overcoming Resistance

Healthcare is historically a late adopter of technology. The late adoption curve has proven to be a barrier to all initiatives that rely on the use of technology for implementation. Accelerating the adoption of all forms of technology in healthcare is considered critical to improved outcomes, expanded access and increased efficiency. While telemedicine has focused on the use of medical and telecommunications technology to provide direct patient care, the development and adoption of related information technology including electronic records and billing systems is an integral part in the evolution of healthcare and critical to the successful implementation of remote medical services.

Telemedicine projects have had to face the problems of organizational change inherent in introducing a new system. The problems have included introducing change into the way that medicine may be practiced and has required the identification of local champions and obtaining top level administrative support to insure that the change takes place. Telemedicine initiatives have also had to deal with the training issues involved in introducing a new system into a health care organization. Training nurses, physicians and billing clerks, among many others, has been a critical step to successfully implementing a telemedicine network.

Potential Areas of Collaboration: Champions for developing remote health and medical services and for implementing advanced HIT often come from different departments with different sets of individual and organizational linkages. New alliances should be made between such leaders from health technology, clinical medicine and public health to overcome resistance and develop joint plans for unified health information networks.

3. Surmounting the Absence of Standards and Guidelines

Standards have been a long-standing issue in telemedicine. Advocates for the development of telemedicine have wrestled with incompatible software and devices using proprietary specifications as well as a lack of agreed upon protocols, guidelines and business strategies.

Until recently, the market for telemedicine-specific medical devices has not been large enough to attract major industry efforts to create unified technical standards. However, in some cases, telemedicine has benefited from technical standards developed for interrelated markets. For example, the use of ANSI H.32x set of standards has facilitated wide-scale videoconferencing interoperability that is leading to a continued growth in that market, a steep decline in the cost of equipment and the ability to conduct interactions between parties independent of the particular hardware used. Certainly the development of HL7 and DICOM standards has also been of great benefit.

Much is yet to be done. Interoperability has not yet been achieved in the rapidly expanding applications in such areas as home telehealth and remote monitoring for patients and consumers.   Fortunately, recent expansion in the telemedicine market, falling costs in the development of new technology and the

convergence of telemedicine and other HIT applications provides new opportunities to create technical standards.

Beyond technical standards, the telemedicine community also needs to further develop unified protocols and guidelines for both clinical and administrative activities related to remote patient care. The need for standards is especially true for the rapidly expanding applications in such areas as teledermatology and mental health.

Potential Areas of Collaboration: With the growing maturity and size of the telemedicine market and the new governmental emphasis on implementing HIT, opportunities are now available for leaders in telemedicine and other HIT applications to work together. Specific areas of collaboration should focus on mutually needed technical benchmarks and high quality communication networks that assure interoperability on several levels. Such levels include allowing different medical record systems to share patient data, assuring that different remote medical devices can intercommunicate with each other or into the same system and allowing health professionals providing distant care with immediate access to the patient's health history.

Certainly not all standards currently under development for HIT may be relevant for telemedicine. ATA is currently working on clinical and administrative guidelines specific to telemedicine. However, significant areas exist for collaboration and it would be prudent for representatives from telemedicine and HIT to identify areas for cooperation.

*An **addendum** to this paper expands on the interrelationships between telemedicine and Health IT in the area of technical standards*

4. Financial Sustainability

A final issue of common concern is the need for sustainability. It is evident that there is a need to build a convincing business case for the EHR. The same issue is also of major concern to various telemedicine applications, especially where those who are asked to pay for the required technology and services are not necessarily those who receive the revenue benefits. In telemedicine, several sustainability models have been created and public policy decisions made that may be instructive. For example, a number of telemedicine programs provide services on a sustainable basis to correctional facilities, which realize cost savings due to avoidance of costly prisoner transports to health care facilities. Some telemedicine networks have implemented a membership model, requiring all facilities participating to pay an administrative fee to cover infrastructure related costs. In others, a unified package has been developed to set prices for both remote health services and information system support.   Other business models have been built on providing off-hours support for emergency rooms or providing scarce psychiatric services where there is sufficient additional business to justify the infrastructure costs. These sustainability models should be able to provide useful lessons for the deployment of the infrastructure required for health information exchange organizations or RHIOs and the National Health Information Network (NHIN). Public policy decisions have also facilitated the development of remote health services Telemedicine programs in Arizona, Kentucky and Missouri have convinced their respective states to make support for telemedicine a line item in the state budget by successfully arguing the public benefit. Several other states have required private insurers to pay for remote health services (e.g. California).

More is to be done and collaboration between telemedicine and HIT organizations could accomplish significant progress in advancing both the fields of telemedicine and HIT, including the development of unified business models that specify cost-benefit factors and identify appropriate technical, clinical and administrative pathways that should be followed.

Other Areas for Consideration

As noted above, consumer empowerment, chronic care and biosurveillance are considered priority areas for the federal Office of the National Coordinator for Health Information Technology (ONC). Many telemedicine programs have focused on aspects of all three areas and have important information,

expertise and resources that can be a resource and should be tapped by both HHS and appropriate state offices.

<u>Next Steps for ATA</u>

Over the next 18-24 months, ATA will initiate a number of specific activities to capitalize on the emerging interest in HIT and to create a broader understanding of the opportunities for leveraging both HIT and telemedicine resources in addressing health care challenges, both in the U.S. and internationally:

- ATA has activated a Standards and Guidelines Committee that is addressing the issue of clinical guidelines and the development of unified road maps. Each road map would identify appropriate technical standards, clinical guidelines and administrative arrangements around a specific remote healthcare application. Such road maps will be designed to stimulate increased adoption of telemedicine and further enhance its efficiency and effectiveness.

- Historically, private sector initiatives to promote agreement and adoption of standards have been proven to be a cost-effective. ATA will actively support private industry initiatives to develop technical interoperability standards that will facilitate the expansion of new applications for telemedicine by working with its Industry Council as well as other private industry initiatives.

- Through ATA's International SIG and chapters, opportunities will be made to engage in international efforts to develop unified standards and guidelines for facilitating cooperation, communication and the exchange of medical expertise worldwide. Relevant standards and clinical guidelines adopted by other countries will be identified as well as barriers to the adoption of unified standards that facilitate telemedicine worldwide.

- ATA supports the work of the U.S. federal government's health information technologies initiatives, will seek opportunities to work in support of these initiatives, and will provide input and assistance to federal agencies involved in the HIT effort. Opportunities for formal liaisons with all federal agencies that are actively involved with HIT will be explored. In addition, ATA suggests that efforts be made to promote greater coordination among existing federal interagency telemedicine (e.g. Federal Joint Working Group on Telehealth) and HIT initiatives (e.g. American Health Information Community).

- ATA will identify barriers to the integration of telemedicine systems into the existing administrative and clinical information systems of organizations that use telemedicine based on an assessment of its members. This information will be used to establish a policy and technical assistance strategy to overcome these barriers that will include collaborative activities with Health Information Exchange Organizations.

ADDENDUM

Standards and Interoperability

Overview

Interoperability for telemedicine and health information technology (HIT) can be considered from two separate, yet mutually complimentary viewpoints. Viewed from a point of care perspective, what may be called *internal* or operational-level interoperability is an essential ingredient for success of any technology-enhanced health care delivery system. Internal interoperability allows components of health information systems to interact with each other. For example, a common physical interface standard, such as the Universal Serial Bus (USB), can allow hot-swapping of cameras and other peripherals, regardless of manufacturer, in PC-based health information systems. Similarly, communications standards, such as the ANSI H.32x series for videoconferencing, allow equipment from different manufacturers to successfully share audiovisual data. Internal interoperability ensures that the point of care encounter succeeds. In terms of telemedicine and health information specifically, success often means achieving effective communication despite differences in location, time, equipment, levels of expertise, and health care organizations involved in the exchange.

The second form of interoperability, at the external or strategic level, complements this success. External interoperability focuses on effective networking and interaction between health information applications and health information systems. External interoperability is at the junction between health information and the rest of health informatics. As such external operability , it is directly impacted by health information standards which seek to tie together EMRs, image archival systems, diagnostic and laboratory systems, and practice management systems, along with health information applications and decision support systems to achieve an integrated continuum of care for the patient, regardless of location, time, or entity providing care. Standards seek to address overarching issues, such as availability, integrity, and confidentiality of health information, and include both industry-created standards, such as HL7 and DICOM, and rules specified through government legislation, such as the U.S. Health Insurance Portability and Accountability Act of 1996 (HIPAA), Europe's EC 95/46 directive, and Japan's HPB 517.

Jointly, internal and external interoperability provide the tools and framework necessary to ensure health care providers from differing locations, specialties, and organizations are able to work together to provide care and services when and where the patient requires them. Standards and rules support clinicians' efforts to:

- Easily exchange information with other clinicians, including those in other specialties
- Electronically exchange information with other health care and administrative organizations
- Adapt new applications to existing systems without undue effort and expense
- Ensure the availability, integrity, and confidentiality of protected health information
- Accommodate the wide variety of technological infrastructure employed among different clinical settings.

The objective of interoperability in a health information environment is to bring together the disparate elements of a digital approach to health care and facilitate networking and communications between them. The disparate elements, whether EMRs, practice management systems, telemedicine applications, or decision support systems, and facilitate networking and communication between them, need to be linked in order to achieve a common goal of improving access to quality health care, irrespective of geographic or temporal constraints.

Technology Standards with Telemedicine and Health Information Systems

Telemedicine and health information have made great strides towards improving the availability of specialty care and provider / patient education resources, despite geographic and economic factors that have historically hampered access by segments of the population. Technological need and budgetary constraints have driven the emphasis on interoperability among these applications, and indeed the advances in interoperability among telemedicine systems form fine examples of how to proceed in achieving interoperability across all elements of the health information environment. Adaptable telemedicine systems and health information applications that rely on open source standards to efficiently provide clinical data, provider feedback, and patient education for incorporation into health information records and to support clinical decisions, form the clinical treatment piece of the digital approach to patient care and, because of their direct interaction with the patient, are a primary source of data collection for the longitudinal record of care.

Essential to interoperability of telemedicine and health information applications are the development and widespread adoption of open source standards among vendors, to ensure ease of communication between divergent systems. For example, a considerable segment of telemedicine relies on videoconferencing equipment to emulate the traditional patient encounter. Often telemedicine encounters are made between primary care and specialist facilities using different manufacturers and models of video conferencing hardware and means of connectivity. The emergence of a series of widely adopted videoconferencing standards, ANSI H.32x, provides easily adaptable CODECs (coder-decoder protocols) that allow seamless communication between different models and brands of equipment. The adoption of standards has brought a new ease of use and greatly expanded compatibility to this vital link between rural populations and specialty care, and provides a working model for similar standards of interoperability between other types of telemedicine hardware.

As in the cultural climate changes necessary to ensure the most beneficial use of EMR systems, interoperability of telemedicine applications requires more than just negotiating communication standards. Focus on quality of audio and imagery, consistent up-time, patient and provider acceptance, and accuracy of data transmission to maximize equivalence to an in-person clinical encounter are also key aspects that will lead to full realization of the benefits of interoperability of telemedicine and health information applications. Ready integration of telemetric data and clinical observations from these applications into health information and decision support systems will form another vital link to support the overall digital continuum of care.

Several federally-recognized initiatives are underway. The Consolidated Health Informatics (CHI) initiative is a federally-guided collaborative effort to adopt health information interoperability standards, particularly health vocabulary and messaging standards, for implementation in federal government systems. About 20 department/agencies including the Department of Health and Human Services, the Department of Defense and the Department of Veteran's Affairs are active in the CHI governance process. In addition, ONC has been working with ANSI and the Commission for Systematic Interoperability to harmonize the various HIT standards that are in existence.

Standards

Standards arise through an identified need to promote quality, commonality, and interoperability within a certain industry or profession. Standards may be formally developed by an industry association or as the result of government legislation, or may appear as *de facto* standards, which gain acceptance through widespread adoption and use in a particular field. In terms of health information interoperability, both types of standards play an important role. Industry standards such as the H.30x video CODECs and the DICOM format for digital imagery provide a vital foundation to ensure quality communication between telemedicine systems. Standards that are promoted by government policy and legislation, such as the HL7 language recognized by HIPAA, focus industry attention and set the stage for common business practices and procedures.

Especially in the rural, isolated and disparate areas where telemedicine and health information hold their greatest promise, *de facto* standards also provide vital links to ensure effective communication and quality health care delivery. *De facto* standards such as the web browser, driven by Hypertext Markup Language (HTML) provides a widely accepted and nearly universally available vehicle for presentation and delivery of content, and has frequently been used to deliver database and program access independent of operating system platform. The scalable bandwidth requirements of web browsers provide ease of access to information under field conditions using a wide variety of computer equipment. Another example of *de facto* standards are the growing body of how-to guides which describe best practices in terms of photography techniques for store-and-forward dermatology, methods for effective presentation of patients during real time telemedicine consults, and similar procedures being developed in the growing field of telemedicine.

Each element of a telemedicine system used in a patient encounter should conform to the appropriate regulations governing the use of medical devices (in the U.S., Federal Drug Administration (FDA) regulations). These elements include Image acquisition hardware (computers, cameras and other peripherals), systems for image transmission, storage and retrieval such as Picture Archiving and Communication Systems (PACS) and wired and wireless networks, as well as software applications for image analysis and clinical workflow management (scheduling follow-up examinations, clinical communication management, and decision support tools).

Uniform standards at all technical and operational levels among all participants in a health information system are essential to interoperability. Adoption of a range of industry standards by all partners (e.g., CPT, ICD9, TCP/IP, etc.) would be the most effective approach. Another important area for standardization is the reconciliation of the differences in clinical nomenclatures among the participants. Development of a "meta-thesaurus", using the widely accepted XML for communicating the information, is one potential step toward a solution. Equally important, uniform standards of practice as they relate to EMR requirements would need to be established.

In order for health information to be interoperable across systems it is critical to use a common language. The need for controlled terminologies has long been recognized as a cornerstone of clinical information system infrastructure. The 2000 National Committee on Vital and Health Statistics Report entitled "Report on Uniform Data Standards for Patient Medical Record Information", cited the importance of standard vocabularies in enabling more precise data acquisition, allowing exchange of comparable data across institutions, and facilitating the implementation of decision support systems. One of the report's key recommendations has recently been implemented. On January 2004, the latest version of SNOMED (SNOMED CT) was made available for use in the U.S. through a national license procured by the National Library of Medicine. The importance of consistent data encoding in electronic data interchange is reflected by the inclusion of code standards as part of the provisions in the HIPAA legislation.

Adoption of formal or de facto technical computing standards is crucial in order to have effective computer environment support. From a network perspective standard internet technologies, such as TCP/IP are essential.

Currently, every health care organization has a unique method of identifying patients. Consequently, a system for coordinating the disparate medical record numbers, involving a single patient identifier, a master patient index, or an automated system of validating individuals' identities, will be required. At the core of whatever system is developed is the need to protect individual privacy. A number of "Master Patient Identifier" systems are commercially available that can effectively address this need, and whether the USA should develop a single "health identifier" is still a very controversial area that is the subject of much debate. Some countries, such as New Zealand, have already introduced such an identifier (National Health Index number, 2005). The Certification Commission for Health IT has been set up to address this issue, among others, and is set to establish a standard for electronic health records in ambulatory settings by mid-2005. The recent (January 2005) Request For Information from the Department of Health Services about the development of a National Health Information Network addressed questions as to the best type of systems for security, authentication, authorization,

identification and data location to be employed on a large scale basis, and received over 500 responses, which are currently being evaluated.

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