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## Standards in health informatics

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EVELYN J.S. HOVENGA

Standards are the key towards facilitating the sharing and exchange of information between departments, health agencies and health workers. They are needed for the information content, language used, database and system architectures to facilitate linkage between systems through an apparently seamless integration of highly distributed systems. This is often referred to as 'interoperability'. Electronic medical or health records need standards, to index and to catalogue health related information for rapid retrieval and to obtain uniform clinical data for research purposes. Without standards, classification and coding systems we are unable to compare the health status, processes of health care, costs and outcomes between various treatment options, health agencies, regions or countries in a meaningful way.

In industry generally the adoption of standards has resulted in an increase in market opportunities and lower costs for equipment and services to users. In health informatics the widespread adoption of standards is expected to improve the health of the nation's population at a lower cost by improving the ability of health professionals, public and health service administrators to share and make better use of the information generated.

### What are standards?

A standard may be defined as a prescribed set of rules, conditions or requirements concerning definitions of terms, classification of components, specifications of materials, performance of operations, delineation of procedures, or measurement of quantity and quality in describing materials, products, systems, services or practices. Standards are benchmarks. Effective standards are needed to guide conditions of data access and data usage and to make it technically feasible to exchange data electronically. This is a prerequisite to cost efficient and accurate data collection and storage, which enhances the retrieval of quality health information needed to obtain the correct knowledge on which to base decisions. Information exchange requires standards which provide a mutual understanding of the meaning of the data used. That is a standard language is needed and the context within which health data are collected or other related information, such as a personal identifier, date and time which are related to clinical observations, must not be lost. Standards may be mandated or be adopted voluntarily.

According to Megargle (1991 p.18) the quality of the knowledge thus obtained is dependent upon three factors, reliability, relevancy and responsiveness. This can only be delivered when standards dealing with for example electronic compatibility, character

encoding and message structuring, are adhered to by the many different computer environments and software programs which may need to be connected to make for example one hospital network. Standards development for health informatics requires input from discipline experts, that is those who need to use the information and knowledge provided by a system. Much of this knowledge now resides in medical records and the health related literature.

## Who develops standards?

Various health and related professional groups, public and private organisations have established standards for paper based health records, for health information systems, for health service delivery and for the health professions. Many such organisations have also implemented mechanisms by which compliance with these standards could be measured. As the automation of health information and communication technology is progressing it has become more apparent that standards for documentation and electronic data interchange within the healthcare sector are urgently required if we are to maximise the benefits offered through the use of these new information and communication technologies. The health care sector has special communication needs.

Several organisations nationally and internationally are addressing this issue from various perspectives. Many standards applicable to information and communication technology generally need to be adopted within the healthcare sector. But additional standards are required specifically to meet the unique needs of the health care sector especially in the areas of data specifications, data integrity and security. Increasingly these are being developed through the well established standards organisations such as Standards Australia, the European Standardisation Committee (CEN), the Institute of Electrical and Electronics Engineers (IEEE), the American Society for Testing Materials (ASTM), the American National Standards Institute (ANSI), the European Strategic Program for Research and Development in Information Technologies (ESPRIT), the International Standards Organisation (ISO), and many others or through ad hoc groups such as health level 7 (HL7). In 1991 Mandil (1991 p.25) noted that ‘despite progress in recent years, the lack of standards remains a major impediment to technical and international collaboration in health and health informatics’. He went on to say that standards ‘tend to liberate cornered clients but (that) they also increase uses of the technology and hence its clientele’.

European standardisation activities for health informatics began in 1990 when the CEN established Technical Committee 251. Standards Australia established its IT/14 committee on health informatics early in 1991. A Healthcare Informatics Standards Planning Panel (HISPP) was established by ANSI late 1991 to bring together the many standards groups which had been developing medical informatics for nearly a decade. Since then many more activities have taken place. In 1993 CEN’s Technical Committee 251 published a directory of the European standardisation requirements for health care informatics which includes a program for the development of standards. Also in 1993 CEN TC251 and ANSI/HISPP produced a publication detailing the worldwide progress made in standardisation in healthcare informatics (De Moor, McDonald, Noothoven van Goor 1993). There is considerable collaboration between the various standards organisations. Priorities for standard development are guided by considerations regarding feasibility, user requirements, medical benefits, and economical impact (CEN/TC 251 1993)

## Which standards should be developed?

Individual needs for standards are being identified daily and concurrently with activities such as the Advanced Informatics in Medicine (AIM) project and the Health Care Information and Communication Network (RICHE) in Europe, the Australian Health Communication Network (HCN), the development of systems to support electronic health records, and with the introduction of new Government policies which aim to provide greater accountability and contain costs. There is consensus that ultimately we will need longitudinal (from birth to death) electronic health records to overcome the problems and costs associated with a highly mobile population, increasing specialisation within the health sector, duplication of data collection, incomplete and inaccurate medical histories, incomplete data for research and policy development purposes. Three years ago Murphy (1991 p.42) reported that a standard description for the content and structure of an automated longitudinal health record was under development. European countries and the United States of America have allocated millions towards standards development in recognition of this need. It is postulated that accurate and complete information will lead to improved knowledge, better decision making, improved quality of care, less cost and better use of available resources.

Gabrielli (1991) identified three reasons for why the medical record was slow to be automated. The first is because of the extensive use of narrative text, secondly because of a lack of a standard medical terminology and thirdly the lack of a medically useful taxonomic code scheme. As a result he notes that clinical experiences are available to others only via expensive research studies, manual monitoring of the quality of care is labour intensive, and health care policies are more intuitive than fact driven.

## Adoption of standards

The adoption of standards may be mandatory or voluntary. Various types of standard exist. This is based on who has developed or adopted the standard or the purpose for which the standard was developed. For example many activities are directed towards the development of a common medical (health) language which is the subject of the previous chapter. There are corporate standards developed and used by one company, industry standards which represent the standards used by an entire industry, Government standards such as GOSIP (Government Open Systems Interconnection Profile) or consensus standards. The latter are the result of input from all stakeholders and are the most useful but may take years to develop.

The adoption of standards is achieved more rapidly when users or potential users insist that suppliers comply with consensus standards. One of the reasons the health care industry in Australia and possible other countries, is so far behind other industries in this regard is because purchasers have continued to acquire proprietary systems. As these vendors are unable to satisfy all health information needs, there is a proliferation of disparate systems and an industry devoted to connecting them with taylor made solutions (interfaces). On the other hand a generic and ultimately more cost effective solution providing faster connectivity, is to adopt the what is referred to as the 'open' solution, which requires only minor adjustments to link machines.

Open systems are those with which other systems can communicate via highly distributed systems. However the extent of such 'openness' appears to vary. Bakker (1994 p.xxvii)

identified five different meanings for the term. Open systems may be characterised by the possibility to communicate with other systems, extract data for external use, import data from external systems in the database, run the system on different hardware platforms or to extend an information system with modules from an other supplier. The latter is possible only if different suppliers produce identical modules. Bakker provided an analogy with cars. Both cars and health information systems are made up of many parts, however the engine meant for one car does not necessarily fit another. He notes that for some of the essential aspects of openness consensus of users and standardisation are indispensable. Another chapter discusses data communications in more detail.

Although open systems are highly desirable, the degree of openness, or rather access to various components of such connected systems, needs to be controlled to maintain patient privacy. Standards are required specifically to ensure that systems enable adherence to privacy and freedom of information legislation, where applicable for system security, and to deter unauthorised access to information. Another chapter is devoted to this topic.

From a user perspective, standards are also required for the user interface. These are emerging slowly. The aim is to allow users to quickly navigate and use any system with minimal training as users within the health sector often need to access a number of different computer applications.

## Conclusion

The development of standards for use in health informatics is pivotal to more and better use of information and communications technology in the health industry. Considerable progress has been made to date, however the widespread adoption of standards has been slow. Purchasers especially need to include the need for standard compliance in their system specifications.

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