The significance of information standards for development of integrated health information system

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ABSTRACT

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Information systems play a significant role in helping to improve health outcomes and decision-making at the point of care, as well as in the planning and funding of care. There is no doubt that new technologies, especially information and communication technologies, could dramatically contribute to achieve better results in our activities in general. The healthcare sector, one of the largest sectors of society accounting, is very complex with many different application requirements. There are also a number of different types of actors that need to communicate for various healthcare purposes (patients/citizens, healthcare professionals and organizations providing health care cervices, payment bodies, pharmaceutical industry, the national governments). Standardization is the first and the most important step in building an Integral Healthcare Information System. However, standardization has been recognized in most of the countries as an important tool to achieve some of the general goals in healthcare systems. The relationship between the participants locally, regionally and nationally requires that information is shared for planning, funding and treatment purposes. Health information standards are instrumental for the operation of healthcare organizations, the planning and management of the health sector, for electronic business transactions and the development of a national system of electronic health records as well. It is necessary to make relevant decisions on adoption of specific health information standards, to adjust them to local conditions as necessary, define in sufficient details methods the manner of their introduction and implementation. The successful implementation of each National Health Information Systems Strategy is heavily dependent upon the implementation of information standards.

KEY WORDS: Reference Standards; Information Systems; Delivery of Health Care, Integrated

INTRODUCTION

As in other sectors, investment in information systems is rising in the health and disability sector. Information systems play a significant role in helping to improve health outcomes and decision-making at the point of care, as well as in the planning and funding of care (1). There are some of global themes that emerge regarding the use of health information systems:

1. Development of electronic health records - Various forms of electronic health records are used to convey clinical information, as well as to co-ordinate care for particular diseases or services.

2. Use of decision support tools - Support is required at service level (e.g. service planning, peer review, trends in medication error) and patient level (e.g. care plans, individual clinical actions, service orders).

3. Recognition of need for connectivity - There is a general drive toward connectivity in most health care systems. Adequate security is also needed to support appropriate access to patient records, messages to and from other care providers, access to scheduling systems, or links to pharmacy systems.

4. Agreement on common standards and minimum data sets - All countries collect minimum data sets, usually from hospitals. While there is some agreement on what the neces-

sary data sets are, there is generally a lack of agreement at the detailed level within countries and across countries.

The health sector is highly dependent on information which is used in both the delivery of care and the management of the sector. The relationship between the participants locally, regionally and nationally requires that information is shared for planning, funding and treatment purposes. Standards are critical to enable this information to be shared effectively and efficiently. Standards are required for information (e.g. data sets, coding), for IT infrastructure (e.g. messaging, security policies), and business processes (e.g. governance). Data and business process standards will be critical in enabling the large numbers of primary and secondary healthcare organisations and referred services organisations (pharmacies, laboratories and radiology providers) to improve patient care by sharing information electronically. It also requires standards to support the integration of care between primary and secondary providers (1).

MATERIAL AND METHODS

Definitions

Standard is a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activi-

ties or their results, aimed at the achievement of the optimum degree of order in a given context (2). Standard is an accepted or approved proposition of a norm or general pattern to be followed and against which others are judged or measured. Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits (3).

Standardized information system is a system which operates consistently and reliably and complies with all applicable regulatory requirements or standards (3).

Healthcare information systems (HIS) used in the broadest sense imply all healthcare data, processes, information, communication and IC technology and people for health systems that support information use. Basically, it is used for patient management and transfers, facility management, resource scheduling, bill calculation, and storage of patient demographic and personal health data.

Information standards

Information standards are necessary to allow for the sharing of health data, for example sharing data between primary and secondary care settings, the pooling of data from a number of sources to reveal the bigger picture and allowing the comparison of like with like across the health sector. The adoption of standards is an essential requirement for improving the quality and usefulness of information for all stakeholder groups, and is of crucial importance in the use of the electronic healthcare record.

The bulk of information systems operated by hospitals and other service providers do not conform to the same standards, making inter-operation and information sharing impossible. This clearly has implications for operational efficiency and effectiveness. In the absence of a national mechanism for the selection and adoption of information standards, health agencies record and process the same data in a great variety of ways. A number of the major health information systems, such as vital statistics, the hospital in-patient enquiry and the national cancer registry, do use internationally recognised information standards. Consequently, the information can be used to facilitate local, regional, national and international comparisons thus illustrating some of the benefits of information standards (Figure 1) (4,5).
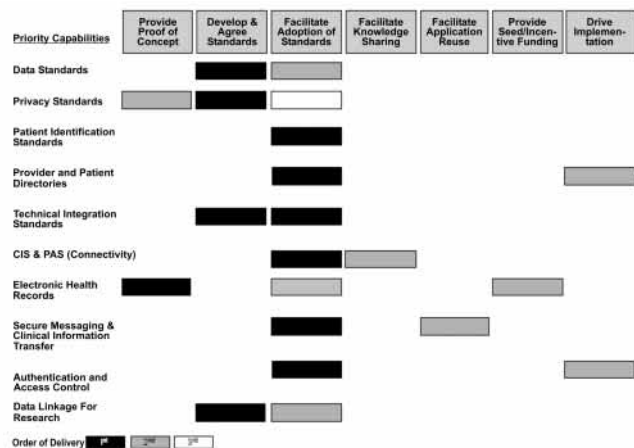

Figure 1. Proposal implementation of information standards (5)

Type of information standards

1. Data Standards - Data standards refer to the definitions and classifications of data elements, including data domains and coding. Data standards also include methods of data collection. Data standards are used within health care systems by clinicians, as well as for aggregation for local and national reporting. Data standards include specifications for single data elements, logical groupings of data elements, terminologies and classifications. It also includes the standard data content required for specific purposes, such as hospital dis-

charge summaries (5). A key requirement for health information systems is to have consistent coding and classification systems for the data items, ranging from the most objective and quantitative (e.g. sex, date of a visit) to the more subjective and descriptive (e.g. symptoms). Standards are essential for clinical terminology since a "day case", an "in-patient" or "waiting times" must each mean exactly the same thing in two hospitals; otherwise comparisons of their activity rates may be meaningless. It is important that data content, e.g. name and address, is recorded in the same format by different health systems (4).

2. Privacy standards - This area includes the legislation and/or policies that aim to adequately protect the privacy of consumers and healthcare providers. It includes consent for both information storage and use. Privacy in health, however, needs to be considered in line with broader cross-sector privacy imperatives (5).

3. Patient Identification Standards - This small but important area of standards deals with the way in which patients are distinguished from one another and the authentication required to use online services. The priorities going forward will be to ensure that: these standards are integrated into clinical workflows and the systems built to support this integration; and the necessary national infrastructure is built for all jurisdictions to use (5).

4. ICT and Technical Standards - Information and communications technology (ICT) includes hardware and software for the support of health information. It covers the telephone, personal computers, mobile devices, computer networks as well as voice, data and picture storage and transmission using internet-based technology and landline, wireless and satellite links. ICT standards are instrumental for the operation of healthcare organizations, the planning and management of the health sector, for electronic business transactions and the development of a national system of electronic health record as well.

RESULTS

One of the first steps in a process of healthcare reform in the country in the process of transition is developing tools for efficient new health care system. As part of the ongoing healthcare reform in these counties, there is a need to modernize existing information handling in the health sector. The based element in the National HIS Strategy is an integrated ICT system that facilitates communication, networking, and integration of the health care organizations. Without a set of national health information standards, information handling would break into smaller networks, stand-alone systems for individual organizations such as hospitals, or individual healthcare providers. Standardization is the first and the most important step in building an Integral Healthcare Information System (IHIS). Functional integration of HIS initially requires support by standardization of the handled data and data structures, the transaction processes, and the architecture of information handling systems. Standardization is essential reduces the time necessary for optimizing the costs when developing of the building systems, training personal, data handling (input-processing-output processing) and as a result, the cost of the systems (6).

Health information standards are instrumental for the operation of healthcare organizations, the planning and management of the health sector, for electronic business transactions, and the development of a national system of electronic health records as well. It is necessary to make relevant decisions on adoption of specific health information standards, to adjust them to local conditions as necessary, define in sufficient details methods the manner of their introduction and implementation.

Taking into consideration the fact that the standardization is a process with different needs and requirements, it is necessary to define a suitable frame, which represents the following relevant influences:

1. Experiences of other parties in the standardization process - while studying standards, their comparative analysis and selection of criteria for the basic set of standards, experi-

ences of standardization bodies working groups, national strategies for the introduction of ICT in healthcare (priorities) of some European countries.

2. National strategy for the reform of the Healthcare System - one of the most important tasks is to modernize HIS in purpose to coordinate healthcare needs and requirements on desired integration level. Results of this process mainly depend on developing and implementation of health information standards.

3. Areas of ICT application in healthcare - patient administration and financial systems, Electronic patient/healthcare record systems (EPR/EHR), pharmacy and electronic prescription systems, knowledge-based systems, intensive care unit systems, laboratory information systems, homecare and telecare applications, radiology information systems, bioinformatics.

4. Domain of ICT application in healthcare - primary care, secondary care, tertiary care, insurance bodies, national/regional planning for public health, laboratories, research, and patients.

5. Electronic patient's record and communication function model EPR/EHR - EHR functions presume communication between: health care professionals, care providers/institutions, patients for decision support, medicolegal protection, analysis outcomes/quality assurance, and medical research.

6. ICT integration level in the healthcare domain - the forms of integration are integrated organizational elements, processes, data, application integrations, technical integration

7. Healthcare data - health information management include classification of data, exchange and archiving data systems, data security, compatibility and interoperability.

8. Environment - various factors such as: political and social, economic and marketing, technological development, time dimension.

9. General conceptual criteria - the degree up to which the IC domain of a particular body is covered by standards, width of the application of a particular standard compared to IC domain, focus of the standardization body activities, and timetable for the adoption of standards.

The criteria and recommendation for the choice of the existing standards (CEN/TC251, ISO/TC215, HL7, W3C...) with the view to adopting a basic set of information standard needed for IHIS. The specific objective is to define needs of health information standards at the national level, e.g. to adopt the process of standardization as a part of the national strategy for IHIS development.

The legal analysis and legal framework recommendation can describe changes in laws and regulations, (that are necessary to be made) in order to implement the recommended health information standards and a detailed work plan and timetable for the implementation of standardization. It is important to mention that the presumptions for the application of IHIS are as follows: The Law on Telecommunications, The Law on Electronic Signature and The Law on the Personal Information Protection (6).

DISCUSSION

Expected effects of the application of the health information standards are reflected in:

1. Creation of national integrated healthcare information infrastructure, which is to provide citizens with the general and free access to healthcare information, and will make possible for the patients suffering from the same illness to create discussion groups;

2. Healthcare professionals Access to information on patients and their treatment;

3. Opening of opportunities for the interactive offer of healthcare services to patients in remote and under populated locations;

4. Adoption of the principle that the standardized EHR, which would accompany each and every patient during his lifetime, present the foundation of healthcare services;

5. Access of healthcare professionals to the EHR at all times and locations, wherever and

whenever the need be, with due respect to the high standards of the data protection;

6. Reconciliation with the fact that the system has to provide privacy and confidentiality, and only professionals with appropriate authorizations should be given access to the professional part of the system;

7. Integration of all segments of the Healthcare System at the institutional level;

8. Prompt and simple access of all users to all information by "on-line" services and usage of the telemedicine services;

9. Efficient use of the HIS for management, planning, account, reporting, and statistics;

10. As a system, it should allow research, getting university education and skills and assistance in the Healthcare System management.

General recommendations for activities which are to lead to the adoption and implementation of the proposed set of information standards can be divided into three groups: recommendations for the standardization process in the field of medical informatics, recommendations in the legislative field that allows standards to function in practice, and recommendations in the field of defining necessary national documents, which would add to the proposed basic set of information standards (7).

CONCLUSION

The successful implementation of each National Health Information Systems Strategy is heavily dependent upon the implementation of information standards. Standards require fully incorporated into the development and enhancement of HIS witch are complex and critical enterprise systems that link together geographically distributed hospitals, clinics, physician offices and other business units with distinct business functions and mutual dependencies. The efficient of health sector is highly dependent on information which is used in both the delivery of care and the management of this sector. For this reason, the role of information standards are very important for effectively and efficiently management of IHIS.

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