A Business Case for Health Informatics Standards

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ABSTRACT

The acceleration of health informatics standards development has both value to health care delivery as well as economic value to the nation's economy. This paper describes the business case for standards development to enable development and implementation of computer-based patient record systems.

INTRODUCTION

Economic benefit is derived from both reduction in cost as well as improved product. A healthier populace is the product of an effective health care delivery system. Reduced health care costs is the result of a more efficient health care delivery system.

A healthier populace is a more productive populace, leading to greater economic gains through lower insurance costs, fewer sick days, decreased accidents, greater attention to detail, etc. Health accrues from many factors, but some include emphasis on wellness, patient education, patient responsibility for lifestyle factors, patient participation in the care process, improved care delivery by providers, etc.

Many of the benefits of improved health care and cost reduction can be derived from effective and efficient use of information. The health care delivery system today suffers from a wealth of data but limited means to put the data to good use. Information technology has not been fully developed and thus not widely adopted in health care delivery.

Again, many factors contribute to the fact that systems to manage health information are not widespread. Significant among these factors are the nature of health data itself (significantly text-based and multi-media), the manner in which it is captured, the speed with which it must be accessed in many cases, and the heuristic way in which it is processed by caregivers.

STANDARDS

A lack of standards which would enable better capture, processing, storage, retrieval, communication, and presentation of data is a significant factor which has contributed to the lack of information technology utilization in health care.[1]

Significant progress in standards development would help to achieve many of the economic benefits.

A dictionary definition of "standard" provides that a standard is something established by authority as a rule for the measure of quantity, weight, extent, value, or quality.[2] Standards development organizations describe six principal types of standards: test method, specification, practice, terminology, guide, and classification.[3]

Standards in health informatics may be any of the six types of standards, though most commonly specifications (e.g., content for a computer-based patient record), practices (e.g., health data interchange), terminology (e.g., medical vocabulary), guides (e.g., properties of a universal healthcare identifier), and classifications (e.g., code system).

Standards may be established in one of five ways: through rules, policies, and practices exclusively defined by and uniquely used by a company; through industry groups or professional associations; by the government in regulation, and by independent standards development organizations.[4] While any of the groups my use a consensus process, true consensus standards are developed by neutral organizations which have brought together people with a diversity of backgrounds, expertise, and knowledge. Consensus standards usually have the greatest acceptance because they have had the widest input and review.[5]

In health informatics, the primary source of standards has been groups other than neutral organizations. Most vendors and providers have had to develop their own specifications. The health care industry has borrowed from other industries in some cases (such as for bar codes). Professional specialty groups have been the primary source of vocabularies and code systems. Government, or quasi-governmental accreditation groups have regulated much of the content of health data to be retained. Consensus-based, voluntary standards development organizations have initiated work in the health informatics standards arena only fairly recently.

BUSINESS CASE FOR STANDARDS

It may be because the standards development organizations for health informatics are the "new kids on the block," that they have not drawn as much attention, are not as productive, and their products have not met with as wide acceptance as standards generated from such types of organizations in other fields. Another contributing factor to the lack of standards in health informatics is that the professionals needed to populate standards groups have tended to focus more on their own professional specialties. Certainly, the health care industry with its "charitable" history has not been one to have funds to support voluntary standards development organizations without seeing direct and immediate benefit, and have not viewed the standards activity from a business case perspective. Finally, informatics, itself, has not received the attention it deserved in a field so overwhelmingly, and rightfully, devoted to the care of people's ailments and injuries.

Standards, however, can provide real economic benefit by lowering the cost to produce product, integrate product throughout a system, and maintain product. In recent years, the value of health information has come to be much more widely understood. There follows, then, that standards applied to health information systems will enable more economically viable product development and more widespread dissemination of such products.

A standard description of the concept of the computer-based patient record would enable vendors to plan and design products. It would assure that known features existed and that specified information could be generated.

Completion of work that has already been initiated on health data interchange standards would provide the capabilities of information transfer among internal and across external systems. The notion of a lifetime health record for a patient can only truly be obtained through a complete and comprehensive set of health data interchange standards.

Standards to ensure confidentiality and security provide the assurance that the data captured and maintained in computer-based patient record systems and moved across a health information network is safeguarded, complete, and accurate.

Lifetime health records also depend on standards for linkage of patient data across the continuum of care. There must be a standard way, either to identify patients or link records of patients. There must also be identifiers for providers and site of care to facilitate information interchange.

Finally, computer-based patient records systems in a health information infrastructure depend on the ability to process data they contain. Such ability to process data depends on either the ability to process text into structured form or the input of structured data. While this is primarily a function of provider preference and technological advances, either (and both may well be the norm for the future) require standards for vocabularies and code sets. To enhance communication a common structure by which vocabulary and code systems can be developed is essential.

SYSTEMS

The Institute of Medicine patient record study committee defined a computer-based patient record as "an electronic record (i.e., a repository of health care information about a single patient) that resides in a system specifically designed to support users through availability of complete and accurate data, alerts, reminders, clinical decision support systems, links to medical knowledge, and other aids."[6] The committee identified 12 attributes such computer-based patient records and record systems should possess:

1. Patient's clinical problems/current status.
2. Measurement of the patient's health status.
3. Logical basis for all diagnoses or conclusions.
4. Linked with other clinical records of a patient.
5. Accessible only to authorized individuals.
6. Accessible in a timely way at all times.
7. Allows selective retrieval and formatting.
8. Linked to local and remote knowledge, literature, bibliographic databases.
9. Assist clinical problem solving with decision analysis tools, clinical reminders, etc.
10. Defined vocabulary.
11. Manage and evaluate the quality and costs of care.
12. Flexible and expandable.

The committee also noted, however, that the computer-based patient record does not exist in such a form, although significant progress has been made at certain sites.[7]

Standards would enable these attributes to be designed into products and used effectively by caregivers.

A patient's clinical problems/current status should be available instantaneously to a caregiver, yet today requires either an historical account by the patient or person accompanying the patient, or access to very limited information such as might be available on an arm band or other such limited set of data. Unless the provider is very familiar with the patient, care must often depend on observation alone.

The collection of the patient's health status depends on a longitudinal record and a standard vocabulary scheme. Such information must be provided over time by both the caregiver and patient directly.

Logical basis for diagnoses or conclusions follows from all information keyed accessible and generally keyed to the diagnosis. While not specifically recommending a problem-oriented structure, the Institute of Medicine committee's vision included the ability to make logical inferences from data.

Obviously linkages of patient's records requires a standard means of identification, or other system of linkage.

Limited accessibility requires confidentiality and security standards. Timely accessibility requires standards for information retrievability within the technology.

Selective retrieval and formatting requires that the technology depends on standard structures that can be presented as desired by the caregiver or others legitimately using the information.

While linkages to local and remote knowledge, literature, and bibliographic databases have been available for some time, they have not been available in the manner which is easy to use directly with patient data. Coupled with clinical problem solving and decision analysis tools, clinical reminders, etc., the technology becomes a powerful tool to deliver care.

The attribute of defined vocabulary reflects the frustrations of communication problems when describing patient conditions, treatment methodologies, and other factors relating to health care.

The first ten attributes contribute to better management and evaluation of the quality and cost of health care.

Finally, the attributes of flexibility and expandability reflect the need for advancing technologies.

INFORMATION BENEFITS

Since the computer-based patient record is still in the conceptual stages, it is impossible to quantify with precision the benefits that can accrue from such a system. Qualitatively, the benefits can be enumerated based on extrapolation of benefits from components which have already been implemented and on comparison with benefits from information technology implementation in other industries. The Computer-based Patient Record Institute has enumerated the following major categories of benefits in its Standards Acceleration Project proposal:[8]

■ Improved patient care is the primary benefit. Better information systems in providers offices, and at the patient's bedside or in their homes will help health care professionals improve care by accessing lifetime patient data, knowledge databases, online expert systems, and other professionals for help with diagnosis and therapy. The patients will be able to make better choices about their health care and to participate more fully in their care.

■ Reduced waste from repetitive tests and potentially even therapies not only reduces cost directly, but reduces actual danger to the patient. A significant waste also is the burdensome paperwork.

■ More efficient care can result from systems which provide for electronic monitoring done at alternate sites, more quickly, and with better data. Better information systems will also enable the shift from the medical model of patient care, centered on episodes of sickness, to one centered on prevention and wellness.

■ Improved financial management has been the primary target of information technology to date, but would be much more fully enhanced with complete clinical information as a resource; while ensuring greater confidentiality through focused, rather than shotgun, access to health data.

■ Improved research results from aggregated health data, which is not only collected online, but organized and structured using standard vocabulary and code structures so as to make aggregate data meaningful.

■ Improved learning occurs by both the health professional and the patient with greater access to health care data.

■ Wider health care coverage can be provided through telemedicine and other technologies which expand the usefulness of information.

■ Support for health policy formulation is achieved through adequate data to make judgements about the quality and cost of health care and the health of the nation.

ECONOMICS

Quantitatively, several estimates of savings or cost reductions directly attributable to the health care delivery system are available. Arthur D. Little suggests that "electronic management and transport of patient information" can reduce health care costs by more than $30 billion per year.[9] Examples of where these savings accrue include: reductions in repetitive diagnostic studies due to inaccessible information; reductions in medication errors from illegible entries, lack of access to alerts concerning contraindications and other protocols; reductions in misdiagnosis from incomplete and/or inaccessible information; improved selection of both more effective and efficient diagnostic studies and medications due to accessible knowledge bases; reductions in administrative overhead resulting from more rapid and direct transmission of patient data for claims processing and clinical utilization; and reductions in the paperwork burden of caregivers.

Several studies confirm such savings.[10, 11] For example, through computerized drug order entry and more effective reporting, one health care system has significantly reduced the number of adverse drug reactions and post-operative infections, and determined that such reductions save $1,939 for each episode of an adverse drug reaction and $14,000 for each post-operative infection.[12]

These benefits will be realized over a period of time and in stages. Some benefits will accrue immediately in systems which exist today. A hospital or physician office which has more than one information system application will benefit from completion of health data interchange standards permitting greater connectivity at reduced cost for customization. Confidentiality and security standards can both simplify and thus reduce cost of system implementation as well as alleviate concerns of both patients and providers. Resolution of identifiers for patients, providers, and sites of care will significantly reduce administrative costs of linking patient data.

Benefits which will have an impact in the near-term include those which describe the concept of the computer-based patient record, and its content and processes. This will have a two-fold impact: First, it will enable vendors to develop products which can be implemented in multiple sites. Today, a lack of standards precludes vending products across institutions and makes research and development of products very costly. Second, a standard description of content will greatly enhance the ability to access and utilize data for health care planning, policy setting, public health, research, and other information purposes. Vendors will know what content requirements exist and government, researchers, accrediting agencies, planners, and others will know what data is available. It will be accessible at much lower cost and much more rapidly, permitting much more timely implementation and utilization of policies and practices that impact health care.

Longer term benefits from standard vocabularies and code systems will further enhance utilization of patient data for improving the health of the nation.

Benefits also accrue to the economy as a whole. Cost reductions in the health care delivery system directly benefit government and employers. A healthier populace makes a more productive populace, also benefiting employers.

Standards, specifically, benefit vendors of information technology, permitting them to invest in research and development of systems which they are assured will meet user needs, be legally acceptable in all states, and operate with other systems. Standard systems drive down unit costs and make them more accessible to purchasers.

It is estimated that the current (1993) health information technology market is $7.5 billion and will grow to $11 billion by 1996.[13] Considering that an average size hospital may spend between $2 and $6 million on a computer-based patient record system,[14] growth in this market could easily double by 2000. In a study conducted by the Health Information and Management Systems Society, respondents indicated that they expected health care reform to accelerate greatly (39 percent of respondents) or somewhat (40 percent of respondents) the advancement of information technology in health care.[15] This same survey conducted over the period of 1992 through 1994

revealed that information technologists see increasing importance on implementation, specifically of computer-based patient records, and integrating existing systems to share information across department and increasing the use of computers by physicians and nurses (prerequisites to implementing computer-based patient records) as extremely important. The speed with which computer-based patient records are seen as needed to be adopted is seen in the increase in importance placed on this by the technologist respondents from third place in 1993 to second place in 1994 given a list of top 10 information systems priorities in health care across the US.[16]

Widespread product development and implementation, such that would double growth, however, depends on standards. Without standards to ensure that products meet the needs of the user community, are legal in all states, and inter-operate with other systems, vendors cannot make the investment necessary to develop and broadly market computer-based patient record systems.

Developing products which meet standards lowers unit costs making them more accessible to providers. Accelerating the standards development effort not only makes the economic benefit accrue more rapidly, but reduces redundant standards development which complicates development of interoperable systems and keeps prices higher.

SUMMARY

Standards acceleration is the key to ensuring that complete and accurate health information is available to care for patients and to manage the health care delivery system. Standards enable product development, which in turn puts the tools into the hands of the users. There are economic benefits for patients, providers, government, and industry.

ENDNOTES

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