

The Role of Information Technology in National Healthcare Systems

A Bi-National Study: The Netherlands – The United States

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This presentation will focus both on the current as well as the future use of information technology (IT) in healthcare systems. Today, in most countries that possess a modern national telecommunication system, IT plays a role in the delivery of healthcare services. The extent that IT has been implemented is extremely variable, not only from country to country, but also from region to region and from locality to locality. This variability reflects the fact that the systems that are involved in healthcare are very much under the influence of economic, social, and above all, political factors. Indeed, the very nature of a country's healthcare system depends on political attitudes and financial conditions.

Enormous progress has been made in both preventive and curative medicine. Much of this progress has been the result of developments in chemistry, physiology, biology and other laboratories. Technical developments have contributed to better diagnosis and treatment modalities. The outstanding feature of IT is its applicability to all these developments. Thus IT is a universal tool that can be of use in any area of medicine, whether it be clinical, basic and applied research, as well as in administrative, financial, and preventive parameters. Since IT is a tool it can be applied in an objective, scientific sound manner not influenced by and removed from emotional factors or political pressure. These qualities are of major value in the practical application of IT.

In just about every country that has an organized healthcare delivery system, there are major problems. Indeed one can observe that a veritable crisis exists in some of these national systems, even though the nations may be amongst the richest and technically most advanced in the world. In the recent election campaign in the United Kingdom, the Labour party platform contained a healthcare plank that – believe it or not – consisted of the promise that waiting lists for elective surgery would be reduced to a mere one month by the year 2005. In The Netherlands, the author

of a very recent government sponsored study decided to leave out mention of clinical care data for the simple reason that they would embarrass the government. When one looks around in Europe, one can point to a large number of shortcomings in national healthcare delivery systems that beg for remedial action. In view of this observation, I would like to ask our colleagues of both sides of the Atlantic to refrain from perpetuating stories about their own or others' healthcare delivery systems that bear no resemblance to the reality. It is true that in just about every system one can find aspects that function well and deserve praise and admiration. But that does not in any way condone the fairy tales that some prominent as well as obscure investigators and academicians continue to write about and to extol about in oral presentations to professional groups as well as the media. It is becoming more evident by the day that this self –serving approach does harm healthcare delivery programs.

The Netherlands and the United States America are nations in which the healthcare delivery system does not meet the expectations of the target population. Both countries, even though different in size, have distinct similarities. They possess modern telecommunication and traffic systems, both are well functioning democracies, and both have healthcare systems that are capable to deliver cutting edge medical services. Yet, in both nations, one can observe major shortcomings. In the United States, the constitution does not state explicitly that the government is responsible for providing healthcare. The constitution of The Netherlands does contain such a provision.

Albeit remote, this difference may well have influenced and continue to influence Dutch legislators and as a result the model of the health care delivery system. Medical care in the United States is in part provided and financed by Federal, State and local governments. The Federal government, in addition to care of members of the Armed Forces, runs the Veterans Administration, the United States Public Health Service, including the Centers for Disease Control. The Federal Government also finances the Medicare Program, a major undertaking aimed at care for the seniors of America

and it funds the National Institutes of Health. Moreover, the Federal Government, through grants and subsidies, supports various national, state and local healthcare programs. These latter programs include medical care for those who for one reason or another cannot afford or are not eligible to obtain an insurance policy covering medical expenses. The vast majority of the working population does have insurance coverage by means of a policy of varying scope and quality, a policy either purchased by the individual(s) covered or as a benefit of employment or membership in an organization. As a result of this combination of sponsors of healthcare programs, the limits of the expenditures for services are subject to both political and market pressures.

In the insurance market, so-called managed care was introduced some years ago in an attempt to cut costs. In spite of managed care, total expenditures for healthcare have not decreased, although the percentage allocated to patient care has been cut, while overhead expenses, including administrative costs, dividends, loan payments, have increased.

The net result to this date has been less service, less access, and more people without insurance coverage. In other words, in spite of expenditures exceeding 1 trillion dollars, comprising 14% of GDP, close to 50 million Americans are without a defined healthcare service program. Moreover, every day, more and more individuals encounter difficulties in prompt access to primary care services. The current state of medical affairs constitutes a crisis.

In The Netherlands, the national government sets the tone, sets the thermostat for healthcare by means of establishing the sum total that is spent on medical services. This amounts to approximately 7% of GDP. Even though the government sets the limits, the insurance industry, primarily through a program that uses managed care as its foundation, controls the execution of the healthcare services. Control is exercised through limits on the amount of funds allocated to providers of services. Although there is a legal mandate to provide coverage to all Dutch citizens earning up to a salary level set by the government, this coverage exists only within the confines of

the budgets that are defined by the insurance programs for such services. (The Dutch government decided just earlier this month – July 2001 – that as of the year 2005, all Dutch citizens, irrespective of income level, will be protected by a basic policy of health care coverage). Insurance companies can and do calculate the amount of funds that can be allocated, thus insuring that the profit margin remains sufficiently large to support their overhead, dividends and maintenance of their infrastructure. The other Dutch citizens, in other words those of means, whose incomes exceed the income limit set in the mandated program, obtain coverage through the purchase of health insurance policies. The companies that issue these policies determine the services obtainable through these policies. As matters stand, the Dutch government's allocation for programs of healthcare is inadequate, resulting in long waiting lists in clinics and hospitals, periodic closing of hospital operating rooms and emergency rooms causing unnecessary fatalities,

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Information Technology = Solution

and less access to medical services from individual and institutional providers. That state of affairs does constitute a crisis as well!

How can IT play a role in solving these critical problems? Already today, IT plays a significant and growing role in medicine. However, in future, IT will play a far greater role, a pivotal role, a role that affects every single aspect of medical science and medicine.

At present, IT has been widely applied in the experimental as well as clinical laboratory; it is being used in the form of telemedicine; it is used in accounting, billing and other financial transactions; it is used in the practice of medicine in a variety of ways, including medical record keeping, research and prevention. Unfortunately the full impact of the use of the many IT applications is being thwarted by the veritable jungle of programs that, after have been installed at enormous costs, cannot deliver, cannot fulfill the expectations of the purchaser. There is an almost total absence of the unique and outstanding characteristic of IT, namely, interconnectivity. In addition, let us not forget that the ability to communicate is at the basis of good medical care.

As matters stand now, thousands of programs have been installed without being able to connect with each other in a meaningful way. The users are thus deprived from obtaining information, more data that are accurate and other essential system functions. Even today, when more and more people have become painfully aware of the sorry state of affairs, there is little or no evidence that a concerted effort to standardize IT (and thus establishing interconnectivity) in healthcare is being undertaken. Institutions, large and small, continue to purchase expensive systems that are of some use internally, but all too often do not interact adequately with other systems, either internally or externally. The same can be said about the usage of IT programs by individual practitioners, physicians, dentists, pharmacists as well as laboratory workers. Not even the fact that the insurance companies have made excellent and intensive use of IT programs in the control of healthcare from their vantage point has awakened the healthcare users to the need to join hands and formulate standards.

What specifically is to be done to insure that full use is made of IT's many capabilities and why is it so important to implement IT in healthcare on a wide scale?

From the point of view of costs, our studies (confirmed by other investigators) have shown that through the implementation of IT on a national, rational scale, in the United States 150 billion dollars that are not benefiting the patient can be saved and the funds shifted to directly benefit the patient. This determination is based on the fact that approximately 30% of total healthcare costs (in excess of 1 trillion dollars) are spent on various issues not related or pertinent to direct patient care (accounting, bookkeeping, float, dividends etc.). This vast amount of money (300 billion dollars) can be cut by 50% through the application of IT.

Fortunately, there are visionaries who are investing time, money and energy in the development of practical models where IT is applied to the maximum possible given the state of today's technology. An outstanding example of such a visionary development is the plan of HealthSouth to build a truly digital hospital in Birmingham, Alabama. Provided there are no major setbacks, that institution will open its doors for modern, high quality patient care later in the year 2003. The type of savings that I have referred to apply to all nations that institute IT extensively in their healthcare delivery system.

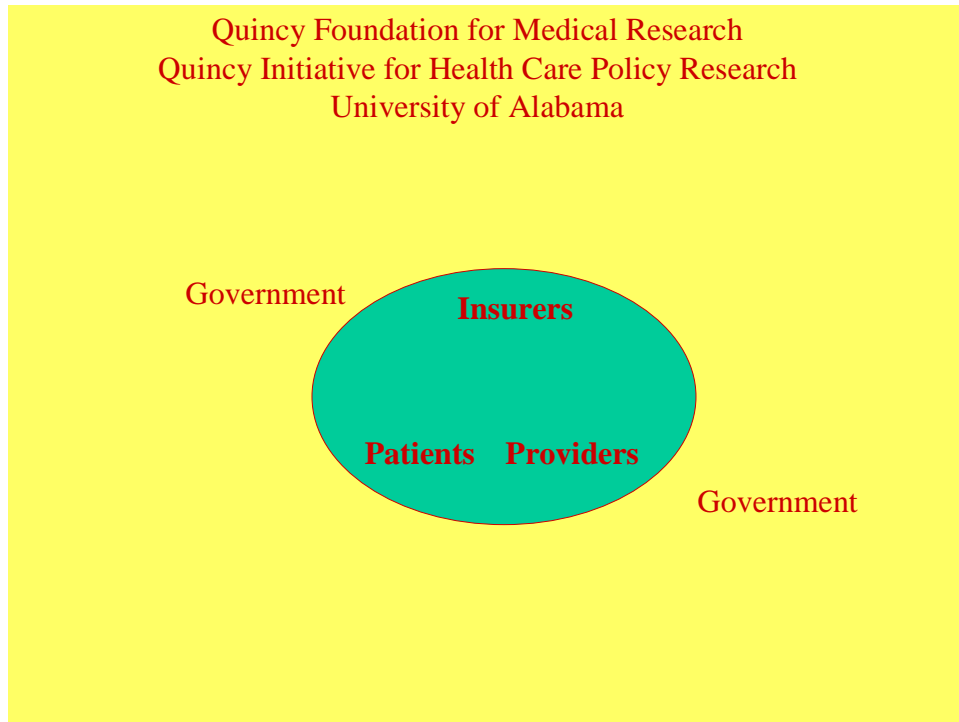
Another area in which IT can show major and immediate results is in the area of error prevention. Most of you are familiar with government studies in the United States that indicate that each year some 90,000 individuals succumb because of errors in the treatment process. Most investigators agree that this horrible figure can be materially decreased through the widespread use of IT. Indeed there appears consensus that at least two-thirds of the fatalities can be prevented, thus a

saving of some 60,000 lives! Can you imagine the savings in suffering, and in emotional and financial costs as well?

Even to date, IT has already shown its mettle in many areas of healthcare. Better patient record keeping, voice activated diagnostic and treatment systems, clinical monitoring, as well as telemedicine. The latter has proved to be of major benefit in rural areas, providing ready access to care. In large geographic areas, such as the Pacific Basin, telemedicine provides access to diagnostic and curative medicine to a population living on atolls, islands, and ships at sea and remote areas across and around the Pacific Ocean, all managed from a single site in Honolulu, Hawaii. Indeed medical care offered by means of IT processes can and does act as a practical substitute in situations where care was either absent or not meeting expectations.

As I have stated earlier, unfortunately, in spite of the progress that has been made, and in part because of the growth of the use of IT, there exists a veritable jungle in healthcare IT. Better management of this vital tool is imperative. To this end, standardization must be implemented and not merely on a regional, local or national basis, but on a global scale.

I will set forth some of the issues that require attention in the formulation of protocols that contain the standards for IT in healthcare.



I – Groups that must agree on Standardization

The following groups must be included in order for a cooperative, consensual protocol to be developed.

A - Users:

- 1) Providers
- 2) Consumers
- 3) Insurers

B – Technical:

- 1) Electronic Medical Record Organizations
- 2) Information Technologists
- 3) Vendors

C – Government Agencies.

A workable computer-based electronic medical record (system) is not only essential; it is the axis around which much of medical world operates.

II – Key Information Content of a Universal Electronic Record

- 1) Medical Information: History, physical findings, progress notes, treatment
- 2) Clinical decision support
- 3) Laboratory Data: written and image
- 4) Pharmacy Data
- 5) Financial-Transaction Data
- 6) Patient Location & Scheduling
- 7) Ancillary Services

It is important also that the factors/parameters that together form the universal electronic medical record are part of a standardized system. The key components are set forth in a protocol such as listed below.

III - Key Components of a Universal Electronic Medical Record Requiring Standardization

(In alphabetical order)

- 1 – Application Software

- 2 – Database system
- 3 – Data Entry Options, e.g. voice recognition, light pen, keyboard
- 4 – Documentation requirements
- 5 – Internet Protocol
- 6 – Medical Terminology
- 7 – Messaging Protocols
- 8 – Operating System
- 9 – Security, Privacy, Access, Electronic Signature
- 10 – Unique Patient Identifier.

It is understood that there are many logistical problems that have to be overcome. Nevertheless, the overall benefits are of such proportions that the problems that require solution are miniscule in comparison. One has to continue to bear in mind that the IT system when applied on a national basis permits access to any healthcare facility as well as the patient's medical record, and the latter without the currently dangerous and potentially fatal delays. In terms of prevention, a national IT system generates a plethora of epidemiological data far surpassing the data that now are gathered by and stored in (often already computerized) national institutions dedicated to healthcare epidemiology and statistics.

Indeed an overview of the use of IT in healthcare suggests a revolution that has forged a new discipline in medicine, **cybermedicine**. Indeed, every aspect of medicine, be it education, practice, or the business side of medicine, comes under the cyber medicine

umbrella. It's implementation deserves support from all stakeholders, since the IT tool brings benefits to all stakeholders --- a true win-win situation for all concerned.

I would like to end this presentation with the following four recommendations:

One – Agreement by all stakeholders on a standardized international uniform medical record, medical data handling and personal medical identifier.

Two – Support of IT educational programs in and for health care.

Three – A set of ethical principles developed for IT transactions and pertaining to safety, privacy, accuracy, disclosure of data and adjudication of disputes.

Four – Inclusion of appropriate backup capability to prevent compromising patient safety and system failure.