A REVIEW OF THE SIGNIFICANCE OF ICT IN PHARMACEUTICAL AND HEALTHCARE SYSTEMS

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REVIEW ARTICLE

ABSTRACT

Information and communication technology (ICT) is becoming a natural part in both pharmaceutical and healthcare system for delivering and giving accessibility to healthcare. The ICT for Health systems is aimed at raising the acceptance of ICT among medical professionals, decision makers, and citizens. One of the activities to help foster this development has been the documentation of ICT strategies in the partner regions an example is the eHealth system. An eHealth system is a new umbrella field in healthcare, medical informatics and management intended to improve healthcare services and to ensure rapid data exchange through the Internet and other similar ICT means, which are necessary for the provision of healthcare services. The mission of eHealth system implementation in focuses on better accessibility, quality, and continuity of healthcare services for country residents through implementation of information and communication systems. It is expected that these processes would lead to higher level of citizen's awareness and involvement in protecting their health; as well as more effective use of available resources for provision and expansion of healthcare services, based on modern IT technologies. For instance, the creation of a common, user-friendly health information service for residents, patients, physicians, and healthcare administrators is the main focus of the vision of the National eHealth system development strategy in Kenya. The strategy is based on experience of good practices in the health system. But direct transferability of these practices is complicated due to laws, politics, financing of the health care sector, computer equipment, competences of medical staff, and, of course, language and cultural differences. This paper presents the applications, advantages and disadvantages of ICT in healthcare systems. Moreover, the ethical and legal practices involving in healthcare systems are also discussed. Finally, the recommendations on the importance of the use of ICT in healthcare system are outlined.

Key words: Pharmaceutical, Healthcare, ICT.

INTRODUCTION

Technology is providing ever more ways of storing and processing medical data. The increasing

processing power of portable devices in particular has lead to the development and linking together of services that would have been hard to imagine only a few years back [1]. New information technology systems (ICT) allow varied information sources to be monitored or combined in ways that provide better, more seamless, care while freeing up staff time and resources. For example, a heart rate monitor can provide 24 hour data from home and so reduce the number of visits needed by - or to - a professional while offering prompt warning of any need for medical reaction [2-5]. HIT should be seen from the perspective of value rather than of cost. HIT investments should be evaluated in terms of how well they help the healthcare system to meet their strategic objectives of better care at sustainable cost while ensuring the social needs of patients are met. It is also likely that in order to achieve these objectives there needs to be better common benchmarks and standards by which procurement managers can compare industry offerings for value and performance.

Sharing and disseminating "best practices", including measuring progress, is important in Healthcare ICT. Spreading best practices is a means to support member states, policy makers, and other actors in the health system in their efforts to address common challenges and create the right framework to accelerate eHealth implementation and diffusion for the benefit of all citizens. *"Learning from each other is not a natural behaviour in the fragmented landscape of European health delivery systems. Taking the time to understand the success factors and the mistakes of others can tip the balance towards better health services through innovative eHealth solutions and thus avoid a waste of scarce resources"*, said Ilias Iakovidis, Deputy Head of the European Commission's ICT for Health [1].

The ICT for Health project is dedicated to raising the acceptance of ICT among citizens and medical professionals. Sharing good or best practice is thus a crucial step in raising the acceptance of ICT not only among citizens and medical professionals, but also the health care authorities [7-10].

MATERIALS AND METHOD

Three fields of applications are prominent in the use of ICT in healthcare i.e. video technology, text messages and health monitoring. An important feature is that a mix of more than one ICT applications has been used in several cases.

Video Technology

The most frequently used type of technology is video technology. In several healthcare systems, the main focus of the intervention is the use of videophones or videoconferencing. Another use of video technology was to complement patient health monitoring. It is notable that web-based video conferencing is being used only in a small number of studies. In all studies involving parents of children with chronicle illness, for example, video technology is used to communicate.

Examples of use of Video Technology

Video technology is used with different types of applications. Examples of use are guiding patients in their use of medical equipment and to improve self-management, via video-based home telecare services. Another use is teleadvice given by clinical nurse specialists in different areas to community nurses. Videoconferencing is used between patients/family members and healthcare personnel for education and psychosocial or emotional support. Another way to use videoconferencing is to enable interactions between patients and nurses. Consultation via videoconferencing in the patient's home is used instead of visits to the hospital, which enabled access to experts to a greater extent. Virtual nurse visits after, for example, discharge from the hospital, are offered to both patients and family members.

Text Messages

As shown in many healthcare institutions, a common way of communicating is via text messages. For sending text messages, websites or web-based programs are used most often. Handheld platforms, such as mobile phones, laptop computers, or text telephones, are used by patients to both send and receive information as well as to communicate. In other systems, mobile phones or hand held equipment are used to send text messages.

Examples of use of Text Messages

Text messages are used for sending messages to patients with self-care advice as a response to symptoms and test results they had reported. Another way to use text messages is by electronic diary for home monitoring to improve communication between patients and healthcare professionals. An electronic messaging program via computers and mobile phones or e-mail and video mail messages is used, enabling nurses and patients to exchange messages to and from anywhere. Via a symptom management system, patients can receive messages in their daily management of symptoms.

Health Monitoring

Health monitoring helps in focusing on patients who sent health data to be analyzed by healthcare professionals. In most of the cases, monitoring patient health, text messaging or video technology is used to communicate the data. Other forms of communication are also used, including the telephone. In developed countries, Health Buddy is the most commonly used device for monitoring patient health. Health Buddy, a system that connects patients in their homes with care providers, is a telehealth device that collects and transmits disease management information about a patient's condition including vital signs, symptoms, and behaviors.

Examples of data involved in Health Monitoring

Types of patient health data collected from health monitoring systems in real time are, for example, weight, blood pressure, heart rate, and pulse.

Other ICT technologies used in health communication and information systems include:

Internet

· The notion of accountability has to be extended to the providers of health information on the Internet.

· Where transactions related to healthcare goods and services (ordering drugs, looking at drug information) are made by Internet, data related to such transactions should be regarded as personal health data.

· Data related to the consultation of health information on the Internet must not be transferred to third parties or used for constructing personal profiles.

Health cards

· All projects and activities concerning the design and use of health cards have to observe the citizens' rights to self-determination and participation.

· No personal health data may be included on the card without the holder's prior consent.

· The card holder must be able to readily restrict access to some or all personal health data held on

the card.

ADVANTAGES OF ICT IN HEALTHCARE SYSTEM

Patient safety: This is mainly due to the reduction of medical error: adverse drug event and related admissions, surgical error, transfusion mistakes, malpractice and expenses.

Quality of care: benefits from improved health professional collaboration. ICT enables clinicians to spend more time with their patients since they are released from paper work, searches for document, planning management etc. The performance indicators of improved quality care can be: reduced length of stay in hospital, physician time with patient and complication reductions.

Patient access to care: ICT improves access to care by streamlining inefficient processes and therefore increasing clinician and staff productivity. It has particular value when it comes to optimization of the use of scarce resources. Main success indicators are : response time to patient inquiries; waiting time for surgery; waiting time for outpatient appointment; lab results report time, chronic disease self management and increased number of health professionals per day consultations. Sensors connected to home alert systems improve safety and prevent deaths among the aged through accidents. In addition mobile technology can regularly check vital signs and allow at home recovery.

Physician and staff efficiency: ICT improves health professionals work satisfaction, increases 'face time' with patient and conversely reduces time spent performing administrative work.

Improved resource utilization: This can be measured in bed turnover per month, length of stay at hospital.

Cost optimization: ICT can reduce medical errors and equally reduce average length of stay. Another issue is a better utilization of expensive resources such as diagnostic equipment. The financial impact of these is: cost per day per patient and overall administrative cost of healthcare systems.

Patient/clinician relationship: A seamless patient/clinician relationship will improve outcomes but only in a general rather than specific way. For example, according to accounts given by patients followed for chronic diseases remote monitoring reduces anxiety since the constant upload of medical data allows reactive decision when alerts occur.

Citizen empowerment: When it comes to empowering citizens, ICT can, through content, offer a means of delivering public education, improving a citizen's lifestyle (diet, physical activities, and addictions management) and aiding disease prevention.

Because they can be used to remind patients with chronic disease to take their drugs or make appointments, mobile phones become powerful tools of compliance.

Accelerate market forces: Tele-health will widespread if it is led by a sound business strategy. Many industries are ready to invest in this area. This will generate growth and employment. Governments should develop targeted investments and incentives to promote ICT.

Research: The use of ICT applications in home care is an expanding research area, with a variety of ICT applications used to increase access to home care.

DISADVANTAGES OF ICT IN HEALTHCARE SYSTEM

The benefits of ICT services to healthcare systems are more difficult to access than those of simple devices or medicines. Moreover it has not been easy, so far, to fund large scale experimental studies into ICT. If the potential of these services is ever to be fully realized then a change of perspective is needed among those who commission and procure healthcare systems.

IMPROVEMENT STRATEGIES OF ICT IN HEALTHCARE SYSTEM

    a. Continued support for the development of uniform ICT interoperable standards, regulation

progresses, common HIT certification process, and common performance metrics, standardize GP information systems and, in order to allay fears regarding confidentiality, expand liability protection for hospital using HIT networks.

b. Involve users in ICT design by demonstrating benefits and foster experience sharing among patients and health professionals. This can be achieved by

c. Keep ICT simple and evidence-based

d. Strengthening organizational and health professionals' awareness skills and leadership in order to champion the further development of ICT use in health sector.

e. Sharing learning about successes and failures

f. Moving from proof of concept to large scale experimentation or implementation and evaluate systematically the impact of the use of ICT.

g. Create a performance reporting framework to receive and report comparative performance data.

h. Educate consumers about the value of ICT in improving their ability to manage their own health.

ETHICAL AND LEGAL CONSIDERATIONS IN ICT HEALTHCARE

First, a description of the meaning of best practice is given. Generally, best practice equals a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. The practices are chosen in order for the regions in the ICT for Health project to learn from one another, to inspire decision makers, and improve the acceptance of citizens and medical professionals towards ICT.

The practices are meant to serve as inspiration to other actors facing the demographic changes of the future, changes in their health care system, and hopefully the practices can help to understand the success factors and the mistakes of others and hence tip the balance towards better health services through innovative ICT solutions and thus avoid a waste of scarce resources [8].

Best practice is based on the following criteria:

i) Practice must be in agreement with general principles, accepted standards, and common ethical values.

ii) Practice must include recognized positive outcome.

iii) Practice must have success in praxis.

iv) Practice must be sustainable.

v) Practice should be innovative.

vi) Practice ought to be transferable.

vii) The practice includes ICT solutions used by/for the elderly suffering from a chronic condition.

Personal health data necessarily touch upon the identity and private life of the individual and are thus extremely sensitive. ICT creates the potential for the free circulation of personal health data, across local, national and professional borders, giving such data an enhanced dimension. There is need for protection of individuals with regard to automatic processing of personal data and especially the protection of personal data, are an essential source for addressing the ethical questions of healthcare in the Information Society.

The following legal and ethical issues are considered as part of Health Communication and information systems:

Confidentiality/ Privacy

The Human Right to respect for private life requires that confidentiality of personal health data is guaranteed at all times. It also implies that, in principle, the informed consent of the individual is required for the collection and release of such data.

Collection of, and access to, personal health data is limited to treating medical practitioners and to those third parties (non-treating medical practitioners, healthcare and social security personnel, administrators, etc) who can demonstrate a legitimate use.

All legitimate users of personal health data have a duty of confidentiality equivalent to the professional duty of medical secrecy. Exceptions to this duty must be limited and provided for by legal rule. Medical secrecy is central to the trustworthiness of the healthcare system, not only in the private interest of the person. Trust is a fundamental ethical value in itself. The respect for the confidentiality of health data continues after the death of the person should be observed.

Status of personal health data

Personal health data form part of the personality of the individual, and must not be treated as mere objects of commercial transaction.

Self-determination

Health data should be collected directly from the citizen wherever possible. Self-determination includes citizens' right to know and to determine which personal health data are collected and recorded, to know who uses them for what purposes, and to correct data if necessary. The citizen has the right to oppose, the use of her/his data for secondary purposes not provided for by law. The use of personal health data for the purposes from which society as a whole benefits must be justified.

Accountability

The networking of health institutions fosters new kinds of dependencies and responsibilities. This has to be reflected in new kinds of accountability. For all parties using health data an equivalent to the accountability of health professionals should be established. When health managers use health data for the purposes of health service planning and management, they should be accountable for such data uses.

Principle of legitimate purpose

The collection and processing of personal health data should be guided by the principle of a strict relationship between this collection and handling and the legitimate purpose to which those data are used**.** Third parties who do not form part of the public health system may require access to medical information for their professional purposes, such as insurers and employers. Such third parties must in no case have direct access to personal health data.

Security

The security of ICT in healthcare is an ethical imperative to ensure the respect for human rights and freedoms of the individual, in particular the confidentiality of data and the reliability of ICT systems used in medical care. The respect for security requires the use of encryption technology where appropriate, the use of closed networks for the transfer of personal health data and organizational measures to support security. Given the importance of the security of personal health data, security standards should be observed wherever an electronic transfer of person identifiable data occurs. Since medicine is a safety ethical environment, ICT systems must be rigorously monitored.

Participation

The right to participate in the medical decision-making process is a key part of the notion of the citizen as a stakeholder. The citizen must have access to his/her electronic health record. Procedures (e.g. consensus conferences, participatory systems design, etc) have to be developed to

encourage and support the participation of citizens' collectives and users in the design of systems.

Transparency

Standardization is inherent in ICT, increasingly in the healthcare sector where classification and coding (clinical protocols, diagnostic related code, checklists, etc) are in widespread use. As these standards are not neutral, but embody value-related choices, they must be transparent and may be subject to evaluation by independent bodies (for example ethical committees, patients' organizations, professional associations).

CONCLUSION

Widespread adoption of ICT could greatly improve healthcare while yielding significant savings. Policy makers and local governments' action is needed in connection with health industry to draft a wide range of policy options.

RECOMMENDATIONS

Qualitative and quantitative evaluation studies with a focus on core effects and implications of ICT systems should be undertaken at all healthcare levels.

In order to make the right of self-determination effective, healthcare professionals should inform patients of their rights without a direct request for such information.Programs of information, education and training should be promoted at to provide citizens, health professionals and systems designers with guidance on the ethical implications of ICT in healthcare and information about the potential, the limitations and the appropriateness of the use of ICT systems.A Directive on medical data protection is desirable within the framework of the current Data Protection Directive to address the particular issues arising from the use of health data in Information Society.

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