The Future of e-Health

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Abstract- **The European Union has promoted several actions on health. The document accompanying the "e-Health"Action Plan 2012-2020, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – "e-Health Action Plan 2012-2020" - An innovative approach to healthcare for the 21st century.COM (2012) 736, describes the vision of e-Health in Europe in line with the objectives of the Europe 2020 Strategy and the Digital Agenda for Europe. The Action Plan presents and consolidates actions to exploit the potential of e-Health, describes the role of the European Union and calls on member states and stakeholders to collaborate with each other. In this paper, the difficulties that affect the spread of e-Health and some ethical aspects of the doctor-patient relationship and the protection of health data are considered. It is clear that the adoption and diffusion of e-Health across borders is a priority for the European Union.**

Keywords-cross-border healthcare, ethical and legal problems

I. INTRODUCTION

E-Health, in which healthcare and resources are transferred by electronic means, is a relatively recent term for the practice of healthcare supported by electronic processes. It is thought that in time with the spread of new technologies such as the Internet, this practice will become more efficient. Therefore, the healthcare sector has considerable potential for growth yet faces numerous challenges in terms of efficiency, as well as financial and social sustainability.

To meet these challenges, several actions on health have been promoted by the European Union. Figure 1 summarizes the main initiatives at European and Italian level in the field of e-Health from 2008 to 2013 [1].

Decision no. 1786/2002/EC of the European Parliament and of the Council of 23 September 2002 introduced a program of Community action in the field of public health [2] and was the first integrated Community programme in this field.

The Digital Agenda proposed by the European Commission is an important part of the Europe 2020 Strategy as it aims to better exploit the potential of Information and Communication Technologies (ICT) to foster innovation, economic growth and progress in the European Union.

For the first time, Directive 2011/24/EU on the application of patients' rights in cross-border healthcare established the rights of patients in Europe who wish to seek healthcare in another member state and be reimbursed for it [3]. The right to healthcare in other member states existed prior to adoption of this Directive; various European Union regulations apply to unexpected medical treatment that might be necessary during a temporary stay abroad (Regulation No. 883/2004 on the coordination of social security systems, and the European Health Insurance Card) [4].

In May 2011, a task force of leading personalities in the field of politics, health and Information and Communication Technologies was established to analyze the role played by technology in addressing the major challenges to the healthcare industry.

The European guidelines for Patient Summaries (2013), provided for by Directive 2011/24, define the data content of the patient summary: a collection of information photographing the clinical condition and health of every citizen [3].

This information can be electronically exchanged between member states to support healthcare for european citizens in any country of the European Union. Each state shall establish a system of storing sensitive information that is in line with the standards of data protection.

Among the Italian initiatives in the field of eHealth is the implementation of Electronic Health Records that contain all the clinical information of the patient and collect digital documents relating to health and social health related

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clinical events. This information will allow decisions of a medical nature to be made much faster, which is especially important in emergency situations.

The ePrescription service allows the electronic prescription of medicine by a legally authorised physician. The prescription is created using specific software and electronically transmitted to the pharmacist. Information relating to drugs dispensed by the pharmacist is then transmitted to the system that manages the electronic patient record in their country of origin.

The process of dematerialization of health records will benefit the organization and management.

The service of electronic transmission of medical certificates allows you to fully automate and digitize the entire process that originates with the production of medical certificates and certificates of illness by the doctor and ends with the transmission, by the worker, certificates to employers.

These initiatives demonstrate how e-Health is an important element of the " e Europe " strategy .

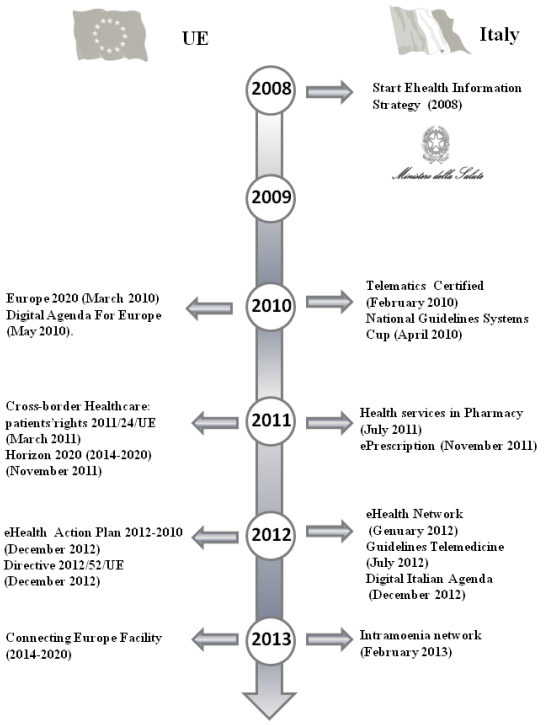

Fig. 1 Initiatives at European and Italian level in e-Health from 2008 to 2013; Board of Health, Italy [1].

II. STATE OF THE ART

In recent years, the development of wireless and mobile networks has encouraged the application of mobile healthcare systems. An important issue is security, as many patients have privacy concerns when it comes to sharing personal information on open channels. These issues must be dealt with and mobile systems might be improved [5]. One challenge is the time that it takes to obtain treatment. This has been addressed by a study which analyses the benefits of telematic services and the use of mobile and wireless devices to develop models that aid the transfer of healthcare. Telematic system requirements which can improve time to treatment for emergency services [6].

The application of healthcare information systems has been shown to assist elderly residents of nursing homes. The use of a web application to collect patient data, creating a personalised electronic file for the residents, has helped physicians to manage the nursing home and the condition of their patients [7].

In the development of e-Health, it is important that attention is focused on the interests of the patient.

III. METHODOLOGY

Among the various initiatives taken by the European Union in the field of eHealth, the following have been analysed: eHealth Action Plan 2012-2020, Directive 2011/24/EU [3] and Law August 6, 2013, n. 96 [8], with which Italy launched the final phase of the formal transposition of Directive 2011/24/EU [3] **.** The Action Plan aims to guide healthcare workers and patients in times of austerity, investing in research to create personalised medicine and cost efficient, high quality care for all.

IV. DISCUSSION

The European Union is interested in strengthening and promoting the efforts of member states in the field of e-Health because this practice can bring several benefits to citizens and health professionals: offering user-friendly, secure systems that allow patients to take greater control over the management of their healthcare [9]. E-Health includes the practice of telemedicine, which uses information technologies and telecommunication to provide healthcare at a distance; finally, as e-Health is the third largest industry in the health sector, it is also an important part of economic growth. As its adoption increases, it will also be possible to reduce spending on healthcare. Finally, it must be considered that in terms of economic advantages, telemedicine can greatly reduce time spent off work and minimize waiting times for physicians and patients alike.

The European Union's population is also rapidly aging: the percentage of the elderly (65 +) and very elderly (80 +)

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will increase from 17.4 % in 2010 to 30.0% in 2060 and from 4.7 % in 2010 to 12.1% in 2060; this will also require a better quality of services and healthcare [10].

However, there are still obstacles to the full deployment of eHealth.

First, we should consider legal barriers:

1) Privacy

Medical privacy, or the practice of keeping information about a patient strictly confidential, has to be ensured. This involves conversational discretion on the part of healthcare providers, and the security of medical records [11]. Privacy can be considered a barrier to e-Health. In e-Health, there is an electronic transfer of patient medical data and medical records to the physician. Healthcare providers must comply with data protection, and in doing so must take significant action to comply with legal restrictions [12]. Telemedicine is challenged by unclear legal regulation for some practices.

2) Security

Data protection in e-Health is very important. There are security issues in the storage of medical data so that it can be accessed by doctors and patients over the web. The confidentiality of medical information is valued very highly by consumers, but there is a real risk that sensitive information might be compromised through electronic storage and transmission [12].

Medical professionals and telemedicine users must always be aware of one of the most important principles of medical practice, that is to say the respect of privacy. In particular, in e-Health we talk about 'sensitive personal data' (relating to "physical or mental health or condition").

Then, there is the question of the type of information that is handled: should there be full data disclosure or just the minimum data needed to form a diagnosis? The patient must be informed about this and must consent to any procedures.

Another topic is access to this data. Information must be collected and recorded in such a way that no outside person can see, copy or download it and clearance should be reserved for the parties concerned (patient, attending physician, or telemedicine specialist). This is one of the occasions in which the Information and Communications Technology specialist must support the medical team. For example, electronic patient files should be accessed only by the treating physician and medical assistants according to necessity, including the possibility of emergency access. Any access beyond that should require a special consent of the patient.

Some questions remain open but one thing is for sure: doctors should respect and maintain confidentiality; if not for legal, at least for ethical reasons.

3) Licensure

The license for a physician is essential to ensure safety. The licensure of physicians is a regulatory function that is performed by the individual state. When physicians practice e-Health across state borders by treating a patient in a different state; there is often no way of knowing if they have licensure, are under suspension, or have lost their license.

4) Other barriers

Due to the exclusive nature of the Information and Communication Technologies equipment used in telemedicine services, it is very expensive to buy and install the equipment necessary for practicing telemedicine.

Another limitation may be the lack of general guidelines for the practice of international telemedicine or rules that can standardize the use of telemedicine across member states. Guidelines should be seen as a set of recommendations that aim to facilitate the exchange of data across borders, understand what data is to be included in datasets and meet organizational and technical requirements.

Therefore, a study of existing legal barriers between member states is important for the diffusion of e-Health in Europe, and to this end the European Commision has created a legal framework for e-Health. The Directive on the application of patients' rights in cross-border healthcare will contribute to achieving this objective, as it defines what rights relating to such assistance remain with the patient across borders.

The document of the Commission services on the applicability of the current legal framework to telemedicine services (Commission Staff Working Paper on the applicability of existing European Union legal framework to telemedicine services) clarifies that European Union legislation is applicable to issues related to reimbursement, responsibilities, and authorizations of healthcare data protection in relation to the provision of telemedicine services across borders.

Since 2013, the Commission has initiated a dialogue on the legal aspects related to e-Health. It should be remembered that rules which serve to safeguard and protect people can not be totally eliminated, but it is possible to standardize rules among the states.

There are also some technical problems relating to the adoption of e-Health, such as:

1) Unavailability of cell phone network coverage or a network with weak reception, especially in remote areas or in the desert.

2) Unavailability of Internet or slow connection.

3) Unavailability or improper equipment used in e-Healthcare such as computers, printers, scanners, a good quality camera, as well as specific telemedicine devices.

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4) Absence of effective information technology systems and supporting infrastructure, which represents a major barrier to initiate a telemedicine program. For example, the method of data transmission must have adequate bandwidth to transmit large amounts of data quickly, accurately, and safely.

Organizational problems:

A standard verification process for telemedicine providers is lacking.

Financial issues are delaying a more rapid uptake of telemedicine.

There is a lack of coordination between clinicians and technology developers.

Standards and guidelines for best practices in telemedicine should be better defined and made more consistent.

To overcome some of these obstacles to the Action Plan of the European Union, a greater interoperability of e-Health services is recommended. This aspect of interoperability concerns the way in which organizations, such as public administrations in different member states, shall cooperate to achieve common goals.

To create confidence in e-Health it is necessary to ensure an efficient protection of health data.

In January 2012, the Commission adopted a proposal for a Regulation establishing a comprehensive framework for European Union data protection aimed at updating the current rules and greater harmonization [13].

Cultural Barriers

Another important limit to e-Health are cultural barriers. These might be due to lack of available information about the practice of e-health, or the unwillingness of some physicians to adapt clinical paradigms for telemedicine applications. Understandably, there is a general lack of confidence in the adoption of e-health, due to the fact that the physician need not be present to offer health solutions. Often, physicians are not even aware of the existence of telemedicine services and, in fact, can often only approach e-Health through postgraduate training, Master's Degrees or university courses. If the possibilities of telemedicine are unknown, neither doctors nor patients will be interested in taking advantage of the multiple opportunities it offers.

In the changing cultural conditions in which it is practiced today, the relationship between doctor and patient is mediated by an instrument of a legal nature which is known as "informed consent."

In principle, informed consent is not reducible to a simple information sheet; it must be signed by the patient (or someone for him): it is the reference point of the doctor-patient relationship, since it contains what is to be done in the present moment from the clinical point of view, on which interpersonal respect, concern for others, the recognition of professionalism and attention to dialogue should be exercised [13].

Therefore, one of the problems in the use of telemedicine is the selection and adoption of an informed consent form suitable for use in e-Health.

Medicine which works on human subjects is also inextricably linked to values such as friendship and justice, and the sick person is not a mere object of the physician's art but is always subject to a therapeutic relationship.

In Italy, Law August 6, 2013, n . 96 Delegation to the Government for the transposition of European directives and the implementation of other acts of the European Union - Delegation of European Law, 2013, with which the final phase of the formal transposition of Directive 2011/24/EU commenced, entered into force on 4 December, 2013 [8].

Until 4 December 2013, people were subject to the rights provided for in the regulations that already governed the assistance of the citizen, in a country other than their own, but this Directive can now be applied. The Directive ensures that citizens have the right to freely choose the place where to seek treatment within the EU.

Important aspects are: prior authorization, reimbursement and border agreements. Each state should now have a system of prior authorization and may also provide a list of health benefits for which permission will not be required.

Reimbursement: a member state will determine at local, regional and national level, the healthcare for which an insured person is entitled to reimbursement, as well as their level of coverage.

In addition to authorizations and reimbursements, agreements between the States which should cooperate to facilitate the implementation of the Directive will be required.

V. CONCLUSION

E-Health is not just "selling" a service or a product; it is a relationship that, while never replacing the human relationship between physician and patient, may still be useful in the treatment of certain diseases. It could also help patients to emerge from the isolation an illness can bring.

The patient must always be protected when accessing online services, for it is necessary to know which sites are safe. On this topic, states must intervene. In addition to the initiatives of the European Union and co-operation between individual states, it is important to promote initiatives aimed at a greater knowledge of telemedicine. It is important to increase confidence among patients but also among

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healthcare workers.

The transmission of knowledge through education (including through training courses, University courses and Master's degrees) can break down barriers more than the implementation of a document, although this is also important and fundamental.

By using cross-border e-Health it will be possible to ensure continuity of care and assistance for citizens. If the system is well built, it can ensure quality healthcare and the adoption of state of the art techniques, in particular concerning the diagnosis and treatment of rare diseases, will ensure the system is more effective and might also reduce healthcare costs in the long run.

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