eHealth in Spain: evolution, current status and future prospects

La eSalud en España: evolución, estado actual y perspectivas de futuro

Andrés Cernadas Ramos[a]
https://orcid.org/0000-0002-1189-9010
E-mail: andres.cernadas@usc.es

Bran Barral Buceta[a]
https://orcid.org/0000-0003-3656-0846
E-mail: bran.barral.buceta@usc.es

Ángela Fernández Da Silva[a]
https://orcid.org/0000-0002-7915-3645
E-mail: angelafernandez.dasilva@usc.es

Ramón Bouzas Lorenzo[a]
https://orcid.org/0000-0002-9103-8893
E-mail: ramon.bouzas@usc.es

[a]Universidade de Santiago de Compostela. Facultade de Ciencias Políticas e Sociais. Ciencia Política e Socioloxía. Santiago de Compostela, Galicia, España.

Abstract

This article aims to offer a detailed analysis of the evolution and implementation of Information and Communications Technology (ICT) in the health sector -eHealth- in Spain. Considering the main services implemented, their current situation and future prospects, as well as their possible impact on the health system and particularly on their users. The scientific literature on eHealth has been reviewed to identify the most widely implemented services and their characteristics. Based on this information, a statewide survey has been designed and administered to users of the Spanish National Health System (SNS) to learn about their perception of the services received and the existing obstacles to their full development. The results were contrasted with other secondary sources. Some services are fully implemented and have a high level of use; others are still at an early stage. It is also confirmed an asymmetric evolution of services delivered by Spanish regional health organizations. It is confirmed that the Spanish health system has experienced an important technological improvement, focusing eHealth towards the delivery of services which highlight equity, quality and efficiency, although there are still obstacles to overcome.

Keywords: eHealth; Telemedicine; eGovernment; Public Health; Health Services.

Correspondence

Bran Barral Buceta
Universidade de Santiago de Compostela. Facultad de Ciencias Políticas y Sociales. Av. Dr. Ángel Echeverri, s/n, Campus sur. Santiago de Compostela, Espanha. CP 15782.

Resumen

Ofrecer un análisis pormenorizado de la evolución e implantación de las Tecnologías de la Información y la Comunicación (TIC) en el ámbito sanitario -eSalud- en España, atendiendo a los principales servicios implementados, su situación actual y sus perspectivas de futuro, así como a su posible impacto en el sistema sanitario y particularmente en sus usuarios. Se ha revisado la literatura científica sobre eSalud para identificar los servicios implementados más extendidos y sus características. En función de esa información se ha diseñado y administrado una encuesta a nivel estatal a usuarios del sistema nacional de salud de España (SNS) para conocer su percepción sobre los servicios recibidos y los obstáculos existentes para su pleno desarrollo. Los resultados fueron contrastados con otras fuentes secundarias. Existen servicios plenamente implementados y con un elevado nivel de uso; otros todavía permanecen en una fase más inicial. Se confirma una asimetría en los servicios ofertados por las administraciones de salud de las Comunidades Autónomas.

Se confirma que el sistema sanitario español ha experimentado un importante avance tecnológico, orientando la eSalud hacia la oferta de servicios centrados en la equidad, la calidad y la eficiencia, aunque todavía subsisten obstáculos a superar.

Palabras clave: eSalud; Telemedicina; Gobierno Electrónico; Salud Pública; Servicios de Salud.

Introduction

The Spanish health system, configured during the dictatorship of Francisco Franco following the example of the Central European continental health systems (Germany, the Netherlands, Belgium, etc.), based on a system of social insurance, was transformed, from the beginning of the new democratic period (end of the 1970s) into a national health system (SNS) of a universalist nature, financed exclusively by general taxation.

Thus, the General Health Law (LGS) of April 25, 1986, which develops the right to health protection that is in Article 43 and is consistent with the Spanish Constitution (España, 1978), articulates a health system based on two general principles: (1) With regard to coverage, the LGS establishes that "all Spaniards and foreign citizens who have established their residence in the national territory are beneficiaries of the right to health protection and healthcare" (España, 1986, art. 1.2.). (2) On the other hand, with regard to the type of access to health services, it is established that this will take place under conditions of effective equality following the maxim "equal access for equal need" and the principle that health policy will be oriented towards overcoming social imbalances (España, 1986, art. 3.2 and 3.3).

The State that emerges from the 1978 Constitution is a State territorially decentralized in 17 Autonomous Communities (CCAA), which are composed of geographical areas of diverse size, attending cultural and historical issues and with wide competences on diverse matters and services, including health services. The State reserves the competences on external health and the coordination of the health system in general, transferring the rest of the competences on health services to the CCAA, concluding this transference process in 2002.

Given the current high level of territorial decentralization, it is clear that there is not a single health system in Spain, but 17 subsystems. Some CCAA offer different services, although the system is relatively homogeneous in basic aspects for the State as a whole.

Health care is divided into Primary Care (AP - *Atención Primaria*), provided by health centers and

outpatient clinics, and Specialized or Hospital Care (AE – *Atención Especializada*), provided by public or subsidized hospitals. The AP is the main access door to the system, while AE attends to emergency services and referrals from primary care centers for interventions that require hospital admission.

In 2015, two laws were enacted that should represent an important step in the implementation of the ICT in the different areas of government in general and also in health services (España, 2015a, 2015b). These laws make up a scenario in which electronic processing must be the usual action of the Administrations in its many aspects of internal management, in its relationship with citizens and in the relationship between the various administrations.

The Explanatory Memorandum of Law 39/2015 refers to "a paperless Administration based on a fully electronic operation that serves the principles of effectiveness and efficiency, by saving costs to citizens and companies" (España, 2015a). At the same time, the Plan for the Digital Transformation of the General State Administration and its Public Bodies (Estrategia TIC 2015-2020) (España, 2015c) was initiated, which will be responsible for implementing the objectives specified in the previous laws.

This accelerated development of ICT has had a strong impact on the field of health, giving rise to the concept of eHealth, which, synthesizing various definitions provided by the specialized literature (Eysenbach, 2001; Marcus; Fabius, 2004; McLendon, 2000; Mitchell, 1999; Oh et al., 2005; Turner, 2003; Urueña et al., 2016; WHO, 2011a), can be interpreted as the provision of services by introducing the use and application of ICT to improve access, efficiency, effectiveness and quality of clinical and management processes for all actors involved.

In this context, health is one of the services that before began to introduce the use of ICT, with an initial desire to reduce costs by automating administrative processes, but also seeking to improve quality, greater security for professionals and users and facilitating access to the system by telematics via Internet (Criado Grande, 2009).

This research team believes that the emergence of eHealth is more linked to the interests and needs of health managers and professionals, although there are sources suggesting that eHealth arises to meet a demand for information from users and to facilitate online procedures and services (Fundación Telefónica, 2006). Regardless of the reasons for its implementation, those who legitimize and give meaning to the system are the end users with their acceptance, use and appreciation.

To collect updated information about the use made of health services currently provided with ICT support, this research team has carried out the Survey on Use and Attitudes towards eHealth in Spain (2018) (Survey-2018). The survey was used to find out in greater detail the use that citizens have been made of the services offered, as well as the perception and value that they have about these services.

Based on the Survey-2018 and other secondary sources consulted, the objectives aimed in this research are: (1) learn about the eHealth services currently implemented; (2) to investigate the knowledge, use and appreciation by citizens of ICT in their relationship with health services, including the most recently created services not collected by other sources; and (3) analyze the aspects that promote or obstruct the expansion of eHealth in Spain and explore what could be its immediate evolution.

Material and method

A systematic review of the scientific literature about ICT in the Spanish health field was carried out, by searching the databases Dialnet, SciElo, MEDLINE/PubMed and Scopus. The same work was made in the web portals of the health services of the CCAA, with the aim of knowing the previous studies and the eHealth services that are currently offered.

Based on this review, and with the purpose of deepening the characteristics and levels of use and knowledge of the main eHealth services provided in Spain, this research team designed and carried out the Survey-2018. The objective is to obtain an updated and adjusted image of the situation presented by the Spanish healthcare model in terms of new technologies, as well as the use and satisfaction of the users with the services

provided by telematics through the Internet by means of the different devices. The data obtained in the survey are compared with other data from secondary sources (SEIS[1] – *Sociedad Española de Informática de la Salud* – and MSBC – *Ministerio de Sanidad, Consumo y Bienestar Social* – via its Sanitary Barometer – BS[2]) collected periodically to verify their consistency with the data from the Survey-2018 and to analyze the temporal evolution of the use of eHealth services by users.

Design survey-2018

We used a Semi-structured telephone survey and data collection through computer assistance – Computer Assisted Telephone Interviews (CATI) –, requesting opinions about issues related to the accessibility to the main services offered by the regional health web portals: online appointment request; access to digital medical records; electronic prescription; digital image and telemedicine. The average duration of this survey was 9.0 minutes, with a time range of 5.7 to 12.3 minutes, with the amplitude of the range determined by the existence of filter questions on the basis of which not all informants had to answer the survey in full. The fieldwork was carried out between May 24 and June 21, 2018 in all of Spain except the African autonomous cities of Ceuta and Melilla.

Population

The questionnaire was applied to a sample of 1,695 people of legal age living in Spain. The phone calls were made randomly using the Infobel phone directory and over different time periods and days of the week. In order to ensure adequate representativeness, the selection of cases considered sociodemographic profile characteristics, establishing quotas by sex, age and housing, with a confidence interval of 95% and a margin of error of 2.45 for the whole sample.

Analysis and interpretation

The information collected was arranged in a coded database following the survey design instructions. The preliminary results was corrected, standardized and recoded in some variables in order to facilitate their statistical treatment.

Finally, a detailed analysis was carried out using the software packages SPSS™ and STATA™, from which the general opinions of the set of informants was extracted, categorizing them and evaluating their relevance to the objectives of the research.

Results

The current status of the main eHealth services implemented in the Spanish health system is presented below.

Prior or telematics appointment

One of the first services included in the web pages of the Spanish health systems has been the request of previous appointment for Primary Care from a device with Internet connection and without the intervention of the administrative staff (Rivero Corte, 2009).

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1 The methodology used for the elaboration of the SEIS Index is based on an annual survey addressed to the ICT managers of the Health Services of all the CCAA, without including in this study the autonomous cities of Ceuta and Melilla. The questionnaire used includes between 50 and 60 items (questions) distributed in 6 categories plus a last multiple question about trends (Technology platform; Expenditure on information systems; Degree of implementation of significant technology projects; ICT management; Security of corporate information systems; General data of the Community and Trends and priority projects). All these data can only be read in an aggregated way at the state level. The SEIS 2015 to 2017 reports have been used, all of which are available at: <https://bit.ly/35rBZux>.

2 Since 2013, the Health Barometer has been asking a series of questions about the knowledge, use and assessment of different services linked to eHealth, specifically about obtaining an appointment, access to medical records via the Internet and telephone communication with health personnel. Likewise, in the first editions of this Barometer, specific questions were also asked about access to health web portals. The survey is carried out every four months, although data are aggregated for each year. The data of the Healthcare Barometer for the years 2014 to 2018 has been used in its Annual version (in which the data collected in its various waves is collected): <https://bit.ly/2IwQ7Ko>.

Various sources show a growing knowledge, use and appreciation by the population of telematics medical appointment. Thus, the Survey-2018 reveals that three in four users interviewed (75.99%) give "a lot of importance" to the medical appointment by telematics service. 63.90% of the people surveyed make frequent use of the service to request, change or cancel the appointment.

The Health Barometer shows a gradual increase in the use of this service, from 45.7% to 51.8%, from 2013 to 2017. Likewise, the knowledge regarding the existence of this appointment request system has increased approximately 15 points, from 62.3% in 2013 to 77.5% in 2017 (BS, 2013, 2014, 2015, 2016, 2017). As for the assessment given by users, their satisfaction is high, ranging from 8.39 to 8.56 points on a scale of 10 points. However, according to data from 2018 (BS, 2018)[3] the telephone continues to be the preferred method for requesting an appointment in AP (35.10%), with Internet appointment requests coming in second (27.60%), slightly more than those made in person (25.30%).[4]

On the other hand, the Index of the SEIS-2018 shows that 66.87% of primary care appointments are still made through non telematics means, so that only 16.53% of appointments are made via Internet, 10.34% by telephone and the remaining 73.13% via other means, mainly in person at the health center (Seis, 2018). In any case, from the above data we can deduce a positive trend in terms of user familiarization with this service. The fact that the Health Barometer and the Survey-2018 reflect a lower percentage of telematics requests compared to the SEIS Index may be due to users not considering that, at the time of concluding a consultation, it is very common that other appointments are set in person at the medical center. Therefore, this information is not included in the Health Barometer nor in the Survey-2018 as it is not mentioned by the surveyed people, but it is included in the SEIS Index.

The electronic prescription

Electronic prescription means the automation of the processes of prescription, dispensing and control of medicines (clinical cycle), with the administrative process for billing dispensed prescriptions (administrative cycle), using new technologies (Fundación Telefónica, 2006). It is a service implemented in the whole country, being progressively consolidated since 2005, in line with the European Union (EU) by several of its programmatic lines (Baixauli Fernández; Brizuela Rodicio; Murillo Fernández, 2015). From the data of the BS two phases are detected for the implementation and development of this service. In the first phase, the electronic prescription and dispensing are introduced in the regional health services. In the second phase, interoperability between the CCAA is pursued through the National Health System (España, 2016), with the first phase now completed and the second well advanced.

According to the Survey-2018, this service is perceived as one of the most valued: more than 70% of the people interviewed give it much (46.8%) or some (23.8%) importance.

Recent reports (Seis, 2016, 2017, 2018) confirm its high degree of implementation; in 2017, almost 90% of the packages were dispensed by electronic prescription.

Electronic Health History

The Electronic Health Record (HCE – *Historia Clínica Electrónica*) is being implemented in almost all health systems in developed countries. It is an electronic record that stores alphanumeric data, images, digital signals, intervention and analysis data related to a user during his life. This record is accessible at any time, with high levels of protection and security (Fundación Telefónica, 2006).

The introduction of the HCE is generalized in the autonomous health services in Spain, being

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3 It is important to emphasize that using only once the medical appointment online request is enough for the BS to compute the person interviewed as a subject using this format, but it does not compute the total of appointments made using this procedure.

4 Other response categories are: "You ask for an appointment by phone and they give it to you via an automatic reply" (6.9%) and "You go directly to the consultation since your health center does not need to ask for a previous medical appointment" (4.8%).

accessible in 16 of the 17 CCAA; in 14 of them the user can access personal data via Internet; 6 of them have mobile applications to access the data and in 5 of them the citizens are enabled to incorporate personal data to their HCD via Internet (Seis, 2018).

According to the Survey-2018, 75.91% of the respondents who say they know about it give much (58.45%) or some (17.46%) importance to the HCE, although 78.89% of those interviewed say they have never consulted it.

In the same line, according to the Health Barometer, 45.7% of users highlight the HCE as the most relevant element in the field of chronicity (BS, 2013) and the fact that this is accessible from any regional health service obtains a degree of agreement of almost 9 points on a 10 point scale (BS, 2014).

According to data from this same source (BS, 2013, 2014, 2015, 2016, 2017), the HCE has a degree of knowledge among users that has increased progressively from 15% in 2013 to 26.7% in 2017. Likewise, in the same years, its use has also increased by more than two points, from 16% to 18.2% and the assessment it receives as a service increased from 7.46 points to 8.04 on a 10 point scale.

Digitalization of images

The digital processing of data and images and their subsequent sending to healthcare personnel represents a great advance, allowing to shorten deadlines and reducing costs and errors (Fundación Telefónica, 2006). Image digitization, together with interoperability, enables specialists in different physical locations to diagnose or offer second opinions, saving time and reducing the need for users to go to health centers. In addition, the digitization of the tests allows the diagnoses to be immediately annexed to the HCE.

In Spain, clinical image digitalization projects are being implemented and have been highlighted by the European Commission (Jasehn, 2017; Stroetmann et al., 2011) as examples of good practice in eHealth.

According to the Survey-2018, the digitalization of images as an eHealth service – something very useful in specialties such as dermatology –

is still in a very incipient state, with only 7% of the surveyed people stating that they have used this service at least one occasion. Even so, the numbers collected by the SEIS (2018) indicate a trend towards an increase in the volume of data in gigabytes (GB) of digital images generated, rising from 1.10 million of GB in 2014 to 2.05 million in 2017, showing the increase in their use. These numbers include both images generated inside the health system and those created by the user, the first being much more substantial than the second, as can be deduced from the data of the Survey-2018.

Telemedicine

Within the concept of telemedicine, understood as the remote and personalized attention to users who require some kind of help or monitoring using ICT, are grouped a number of features. Their purpose is to promote the autonomy and independence of users by reducing their need to go to the health center (Hernández et al., 2009; WHO, 2010), as well as their admission in care centers.

Telemedicine can be differentiated into two types of assistance. One is the teleconsultation – following synchronic or diachronic processes – consisting in carrying out a specialized medical consultation without the need to go to the assistance unit to have a consultation (Urueña et al., 2016). Another is telecare, a remote assistance and monitoring at the patient's home, by means of devices such as bracelets, necklaces or belts that collect information that are transmitted remotely to the supervising medical team. The latter is preferably used for patients with chronic pathologies such as diabetes, hypertension, skin diseases or other pathologies that present unexpected and short term reactions. This type of assistance allows for immediate local monitoring of these users, providing them with the necessary information and assistance in their own homes.

According to the data provided by SEIS (2018), the telemedicine specialties most widely implemented in Spain are: teledermatology and teleophthalmology (11 CCAA); oral anticoagulant treatment and telecardiology (9 CCAA);

telenephrology, telecare (nursing), teleneurology and telepulmonology (6 CCAA).

Specifically, in the Survey-2018, users were asked about the frequency of medical video consultations and remote control of health indicators (glucose levels, blood pressure…). The data obtained about the video consultation show how the use of this format is for now very limited (2.61%). Something similar happens with the control of health indicators, which although they show an improvement with respect to the previous service (10.29%), it still has a very low use.

The 2014 Health Barometer asked users to assess the importance of facilitating patient follow-up by medical professionals using ICT, including telephone attention, obtaining great support from citizens with an average score of 8.18 on a scale of 10 points (BS, 2014). This barometer shows that, between 2013 and 2014, there was an increase from 35.7% to 41% in the knowledge about consultations by phone (BS, 2013, 2014), stagnating around 42% in the following years; the use of this service is around 38% and its average assessment is 8.13 points on a scale of 10 points (BS, 2015, 2016, 2017, 2018).

The fact that the question of the BS about telecare includes user care by phone along with care via the Internet seriously distorts the use of telemedicine services, because if this care by phone is not included the data of use of this service falls significantly.

New services and improving existing ones

The regional health portals are the web infrastructure to access health services and eHealth services in particular. The numbers obtained from the Survey-2018 indicate that almost 50% of the interviewees who state that they have connected to the Internet in the last year have visited the health portal of their CCAA. According to this same survey, the main reasons for not having visited these portals are: coverage of their needs by traditional means (43.7%); lack of interest (26.8%); lack of knowledge about the existence of the portal (21.5%) and coverage of health care by other providers (10.3%). The survey

also reveals that more than 90% of users show a medium to high level of satisfaction with the health portals.

In the Survey-2018 a question was introduced asking users of health portals to evaluate their satisfaction with the services offered in order to determine if the services currently offered are considered sufficient or not. The data collected show a high level of satisfaction (83.48%), considering the services implemented as sufficient. Among the remaining 16.52%, that did not consider this offer sufficient, are those that propose some new service, those that suggest improvements to the current ones, or that request services offered in some CCAA.

Specifically, the following results were obtained regarding necessary services: the possibility of consulting a medical history (8.6%); complaints mailbox (7.7%); the possibility of consulting information about the centers such as the medical staff, specialists, services, etc. (7.7%); preventive recommendations or information about specific illnesses (6.8%); simplification of the procedure for changing appointments (6.7%); making appointments with specialists/nurses (6.1%); a website that is easier to use and has all the services offered (5.8%) and the possibility of consulting waiting lists (5.1%).

Discussion and analysis

Contextualization of the data

Two elements that initially contribute the most to the introduction of ICT in the health field are: technological evolution, which allows increasingly advanced and efficient solutions for different management areas; and the belief that investment in technology for health management may have positive returns and contribute to reduce costs.

This explains the emphasis on promoting online appointment requests, as the cost of an appointment in person is approximately 8 times higher than the cost of a telematics appointment, which, considering that the number of annual appointments exceeds 30 million, represents a significant saving for the system. Similarly, the electronic prescription, in

addition to allowing a large reduction in paper costs, is an instrument to which benefits are attributed in terms of effectiveness and efficiency, reducing errors in dispensing and facilitating billing, allowing improvements in management and greater control of pharmaceutical spending (Monteagudo Peña, 2001).

Something similar could be said about home telecare programs that aim to reduce hospital admissions and average stays, with the consequent reduction of costs in the hospital system.

At the same time, HCE, in addition to avoiding the use of paper, facilitates immediate access to clinical information relevant to medical care for a user, allowing also to minimize the risks of loss of information and unnecessary repetition of diagnostic tests. But it should be understood not only as a mechanism for data storage and recovery, but also as a tool that facilitates interaction and relationship between different health professionals (Rivero Corte, 2009).

Although the initial objective of eHealth implementation seems to be more aligned with the search for an improvement in efficiency, it has been observed that this may also contribute significantly to increasing the efficiency of the health system by avoiding errors, misplacements, duplications, displacements and increasing the access of users to the system.

Which phase are the Health services currently in?

The report prepared by the United Nations about the level of development of e-government in the world placed Spain in a relevant ninth place in 2010. But in recent years this position has not remained stable and Spain is being overcome by other countries that have made greater investments and made a more decisive investment in ICT in the field of management and service provision (UN, 2018).

As shown by the data provided, there are services whose use is fully extended as the electronic prescription, the HCE or the Internet appointment request, although in the latter, the advances experienced do not alter the role of the AP as the main gatekeeper of the system.

Meanwhile, the possibility of sending digital images or telemedicine services are in a more incipient phase, so they would need more investment and development.

Some instruments, such as the HCE, despite their full implementation, show low use by users, which could be due to the access barriers imposed to preserve the security of the data stored there, both for users and professionals. Despite all the controls provided, there is still some mistrust among the population and fear that someone may make commercial or unethical use of these data.

Other instruments such as telemedicine progress more slowly. In this sense, different pilot projects are being carried out which, although it is true that they show positive results such as cost reduction in tele-assistance or telecare, do not always have enough continuity to settle and be assessed with the appropriate information.

The analysis shows that access to the Internet as a source of information, new forms of communication and devices and applications that allow users greater control and monitoring of their health, contribute significantly to their empowerment (Fundación Telefónica, 2017). This fact would be the result of the concatenation of medical science, new technologies and users increasingly interested in their health (Martínez Ibáñez, 2009), which according to some authors (Hernández et al., 2009) would allow us to talk about the ePatient, that is, a more proactive, more informed patient who seeks to participate in the decisions that affect their health. The choice of a 2.0 *health care* system defends that this new model places the patient at the center of the system, but that it could also imply risks by transferring the responsibility for patient's health to himself, something that has traditionally been attributed to the health care system.

Along these lines, the CCAA are currently in an incipient phase of adapting their web portals to facilitate access via smartphones, given the growing use of these devices. At the same time, various apps are being developed for smartphones, allowing the user to interact with health personnel or control some activities or behaviors, which leads to talk about mHealth, which consists of providing

health services using this type of device, and this can be an important boost for eHealth and, specifically, for telemedicine (Silva et al., 2015; WHO, 2011b).

It is necessary to point out that the HCE is an instrument that acts as a support for the development of other services, such as telemedicine or the digitalization of images, which makes it a fundamental tool for the evolution and consolidation of eHealth. Similarly, the eHealth services currently implemented are instruments that, by their very existence, bring significant advantages to the user, regardless of whether they make active use of them.

What can keep eHealth processes growing? Facilitating elements

The elements that favored the development of eHealth at its beginning are still in force. It allows managers to have a greater control of the services and professionals begin to perceive utilities that may facilitate and simplify their work.

Regarding the role of users, this research shows that they are able to establish points of improvement related to the accessibility and comprehensibility of the information provided and to assess those services they have used, but they find it more difficult to propose new services. In fact, when users are asked about the implementation of new services or the modification of existing ones, most of their proposals are aimed at improving the services they have already been using, or they request the simplification of services offered in some AACC – as may be the case of the complaints mailbox or the consultation of waiting lists – but they usually do not propose new services.

Thus, services such as the online prescription renewal for chronic patients, as is already being done in Portugal (Pedir…, 2019), knowing what medicines are available at the pharmacy before going to pick them up, or having a more fluid communication with the assistance personnel via email, among others, could be very convenient for users. But this team understands that the detection of new services or the susceptible

improvements of the current ones, is perhaps a facet that corresponds more to the health administration - especially to managers and professionals -, than to the users, although the participation of the latter is considered essential for an adequate evaluation and assessment of such services. In this sense, it would be necessary to carry out future research of a comparative and prospective nature that could provide practical and applied information about future developments in the field of eHealth.

And it cannot be ignored that once the eHealth processes are initiated, they follow their own dynamics. Thus, when the two phases described above for the interoperability of the electronic prescription and the HCE are completed, the interconnection will be complete in the 17 health subsystems. This will facilitate the health mobility of users between CCAA, avoid losses and common errors in physical prescriptions, incompatibilities between medicines and, at the same time, allow managers to monitor the dispensing of medicines. In addition, sometimes developments can be more conditioned by the technological offer than by the demand of the political decision makers. However, these processes are no longer reversible and will continue to be developed in the near future.

As the WHO points out, telemedicine is one of the most convenient options for overcoming geographical difficulties or scarcity of health resources, which would make it possible to overcome spatial and temporal barriers between health care providers and users. For this reason, we must continue to advance in this direction (WHO, 2011a).

Difficulties and obstacles for the expansion of eHealth

However, as stated in the previous sections, eHealth is not exempt from elements that obstruct a greater development and implementation.

Thus, in order to advance in the interoperability of the different health subsystems, eHealth encounters difficulties, such as the mistrust of the CCAA to share health information, the existence of codification criteria that don't always

are synchronic, or the use of the three regional languages in addition to Spanish. However, despite these obstacles, interoperability is increasing and it is expected that it will be the line to follow in the near future.

As far as users are concerned, the greatest problem encountered by eHealth for its full acceptance and use is that the people who most frequent health services are those over 75 years old, multi-frequenter users, a group that does not have sufficient resources and/or digital competence to make full use of eHealth services.

Thus, the implementation of the different eHealth services exposed, have also other potential risks such as: the concern for the adequacy of web content, the confidentiality of online data, the unequal technological development, the absence of interoperability between computer systems or applications, the doubt about the recovery of investments, the lack of leadership of a common state policy on eHealth, possible depersonalization of care, insufficient investment in ICT or lack of training of professionals and their resistance to change and increased workload (Cernadas Ramos, 2010; Criado Grande; Navarro Gómez, 2010; Fundación Telefónica, 2006; García Cantero, 2009; Mahtani Chugani et al., 2009; Roig; Saigí, 2009, 2011; WHO, 2011a). All these risks must be considered when designing intervention strategies in the health field.

On the other hand, it is important to point out that the services analyzed seem to be sufficient to cover the assistance needs of the users. According to data from the Survey-2018, a majority of users (83.48%) who have visited their health portal consider satisfactory the information and services available. When analyzing the reasons for dissatisfaction of the remaining (16.52%), the data point both to users' lack of knowledge about their ability to access these services, and to the non-implementation of some of them in their respective Autonomous Regions, especially in access to the HCE. However, it is assumed that the immediate availability of personal clinical information or interoperability are aspects that can lead to a high degree of importance to this service.

In this line, regarding the clinical part and seeking to overcome obstacles or difficulties, the use and exploitation of large databases (Big Data) could allow a deepening of medical care based on evidence. The detailed analysis of these health data – where again the existence of the HCR plays a significant role – is postulated as a potential tool for systematization and exploitation. The aim would be to achieve better detection of side effects of drugs, better and more appropriate treatments, as well as the advancement of personalized and preventive medicine (Urueña et al., 2016).

Final remarks

The results obtained allow us to verify that the Spanish health system has experienced an important technological advance, with a series of fully implemented services and others more recently created that are being developed at different rates, orienting eHealth towards a service focused on improving the efficiency and effectiveness of the system.

It would be necessary to intensify the efforts in infrastructures, in digital training, in the visibility of the services, as well as in their generalization and improvement, so that eHealth is consolidated and accessible for all the groups involved and, especially, for the users.

As far as the budgetary situation allows, it is to be expected that eHealth will continue to develop, especially in those services or areas in which the investment has higher rates of return. This kind of feature becomes even more useful after the situation of confinement imposed in Spain – and in many other countries – because of the pandemic generated by SARS-CoV 2, highlighting the need to reinforce the channels of medical care without hospital admissions to avoid the collapse of the specialized care system.

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