# What do e-health services in Spain offer and what are the demands of users? A national survey

Andrés Cernadas Ramos, Ángela Fernández Da Silva, Bran Barral Buceta, Ramón Bouzas-Lorenzo

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Andrés Cernadas Ramos[1*] Prof Dr; Ángela Fernández Da Silva[1*] Professor and PhD; Bran Barral Buceta[1*] Prof Dr; Ramón Bouzas-Lorenzo[1*] Prof Dr

[1]Universidade de Santiago de Compostela Santiago de Compostela ES
[*]these authors contributed equally

**Corresponding Author:**
Ángela Fernández Da Silva Professor and PhD
Universidade de Santiago de Compostela
Avda. Dr. Ángel Echeverri, s/n. Campus sur
Santiago de Compostela
ES

## *Abstract*

**Background:** The accelerated development of ICTs has made healthcare one of the pioneering fields in the incorporation of these tools. New technologies have been applied; the existing ones have been sophisticated and improved, and the concept of e-Health has expanded These advances and expansion of e-Health, however, do not seem to have served to adapt the supply of services to users' demand; rather, supply seems to be governed by other variables.

**Objective:** The main objective of this work is to review the existing differences between user demands and the supply of e-Health services in Spain and their causes. The aim is to provide information on the level of use of the services, the causes of the variation in demand for these services, which can be useful in correcting existing differences and adapting them to the needs of users.

**Methods:** A Survey of Use and Attitudes towards e-Health in Spain was applied by phone to a sample of 1,695 people of legal age, taking into account sociodemographic profile characteristics (sex, age, habitat, educational level). The confidence level was of 95%, and a margin of error of ±2.45 for the whole sample.

**Results:** The results obtained show that the online doctor's appointment service is the most used by users: 72.48% have used it at some time and 21.28% say they use it regularly, while other services show significantly lower percentages of use: "managing health cards" (28.04%), "consulting medical history" (20.37%), "managing test results" (20.22%), "communicating with health professionals" (17.80%) and "requesting a change of doctor" (13.76%). Despite this low usage, a large majority of respondents (80%) attach great importance to all the services offered. 16.52% of the users surveyed were willing to make new service requests to the regional websites, with 9.33% of them highlighting services such as "the availability of a complaints and claims mailbox", "the possibility of consulting medical records" and "the availability of more detailed information on medical centres (location, medical directory, waiting lists, etc.)". Other outstanding requests (8.00%) were to simplify the procedures for using certain existing services.

**Conclusions:** The data from the survey show that eHealth services are widely known and highly valued by users, but not all are used with the same frequency or intensity. It appears that users find it difficult to suggest new services that might be useful to them in terms of demand for new services that do not currently exist. It would be useful to use qualitative studies to gain a deeper understanding of their currently unmet needs and the possibilities of e-Health. The lack of access to and use of these services and the unmet needs particularly affect the less able, as they have the greatest difficulty in meeting their needs through alternative means.

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understanding of their currently unmet needs and the possibilities of e-Health. The lack of access to and use of these services and the unmet needs particularly affect the less able, as they have the greatest difficulty in meeting their needs through alternative means.

**Keywords:** *Spanish e-Health; Health Policies; Digital Health; COVID-19; e-Health Offers; e-Health Demands.*

## Introduction

In recent years, information and communication technologies (ICT) have become a central issue on the political agenda [1]. The accelerated development of ICTs had a strong impact on the field of healthcare, making it one of the pioneering areas in the incorporation of these tools, leading to a renewal of healthcare systems [2,3].

The introduction of ICTs in the field of healthcare gave impetus to the e-Health - a set of tools used in the healthcare environment, ranging from prevention to treatment, including diagnosis and monitoring, as well as health management. e-Health led to cost savings in healthcare systems, and has improved access, efficiency, effectiveness and quality of clinical and management processes for all stakeholders [4–7].

As new technologies have been applied, and the existing ones have become more sophisticated and improved, the concept of e-Health has expanded, incorporating new elements to its definition, such as telemedicine (i.e., ICT-supported healthcare) through, for example, images digitalization or consultations via video calls[8]; or m-Health, the development of medical practices supported by mobile devices, such as smartphones, PDAs, tablets or wireless patient monitoring devices [7,9]. These advances and expansion of e-Health, however, do not seem to have served to adapt the supply of services to users' demand; rather, supply seems to be governed by other variables.

It seems that e-Health has not taken user demands into account, as it has not adapted the supply to these demands.

## Toward whom is e-Health oriented?

Initially, this term was not promoted in the academy, but based on a commercial logic, under the assumption that benefits generated by the ICTs in other areas could also be generated in the health sector, with similar results. This approach led to a change in the conception of the patient, passing from user to consumer [4].

e-Health was born from the purpose of reducing costs and automating administrative processes, revealing an orientation more linked to productivity than to meeting the needs of users and facilitating online procedures and services [1,10]. This trend is in line with the willingness of large corporations, which seem to be joined by public administrations [11,12].

Increases in investment have facilitated a considerable expansion of knowledge, as well as of technologies, techniques, skills and resources. It made several achievements possible: addressing

health problems much more effectively [3]; increasing quality and safety for both professionals and users [1]; streamlining the performance of health systems; increasing the co-responsibility of individuals for their own health; and achieving greater efficiency and sustainability [13].
However, the purpose of using ICTs to support cost optimization has led to a decrease in investment in services [14] and the configuration of an e-Health model that is more closely linked to the interests and needs of health managers and professionals than to those of users [15].

## Current e-Health development level

The application of ICTs to the field of health may generate benefits for the actors involved (users, professionals and managers), offering a space for information, a means of interaction and a tool for the provision of services [16]. There are factors, however, that attenuate or slow down the development of ICTs in the healthcare field [17], among which are the distrust of some users of the preservation of their personal data [10,18–20]; the lack of digital literacy of some population groups [21,22]; problems of interoperability of clinical information systems [23]; or the lack of common protocols for the different healthcare systems [24].

In Spain, the implementation and development of e-Health continues to advance. Its degree of development is not yet complete, but shows asymmetries depending on the different services. Thus, the telematic request for appointments and electronic prescriptions are fully implemented. In opposition, tools linked to the digital images management or access to digital medical records have not yet been fully implemented [25].

Although the pandemic caused by the SARS-CoV-2 virus highlighted the potential of e-Health [26,27] and implied a significant change in the way users and healthcare professionals relate to each other [28–32] it has not brought about major changes or innovations, although it has accelerated processes initiated previously.

Although this study is not intended to assess user’s satisfaction with the service, which would lead us to an approach based on satisfaction of expectations that, as is well known, may be modeled from the outset so that the gap between what is expected and what is obtained is as small as possible, and thus does not discourage possible future use [33,34]. However, the different gaps initially formulated by [34], should be taken into account, since, as has been shown in the previous work of [35],previous satisfaction strongly conditions the expectations of future use. Therefore, policy makers, and

especially those responsible for the development and implementation of digital health, if they want to encourage the use of online health services, should ensure that they generate services that are fully satisfactory for users, since these results will generate positive expectations that will lead to greater use of online health services in the future. Sometimes services offered are not sufficiently tested and run, with the consequent frustration for users and professionals who do not see their expectations met. This may generate distrust in the system as a whole, making its use difficult in the present and the short term [36]**.**

## Methods

The main objective of this paper is to analyze the existing differences between user demands and the supply of e-Health services in Spain based on the results of a population-based survey. The aim is to provide information on the level of use of the services, and on the causes of the variation in their demand. It also points out other services that could be useful for users.

Results are obtained from a block of questions in the survey that allows us to examine in isolation certain profiles of use and acceptance of e-Health according to social characteristics (age, sex, educational level and habitat). This allows suggesting causes of such mismatches, based on the detection of mismatches between the supply and demand of services.

To gather information on the e-Health services provided by public health portals in Spain, as well as the use made of these services by users and unsatisfied demands, a *Survey of Use and Attitudes towards e-Health in Spain* (hereafter, e-Health Survey) was applied.

Prior to this, an extensive analysis of the recently published scientific literature on e-Health was carried out with the aim, firstly, of finding out what services are currently offered in different countries in this post-COVID stage and, secondly, of investigating unmet user demands. In addition, to support the survey design, heuristic and user tests have been carried out with the intention of defining questions and categories for analysis.

## e-Health Survey Design

The survey was conducted through telephone calls and was supported by Computer Assisted Telephone Interviews (CATI) technology. During the survey, opinions were sought on questions

concerning access to the main services offered by the 17 regional health web portals: requesting medical appointments; access to the digital medical record; management of electronic prescriptions; digital imaging and telemedicine. Other questions were also included to identify the services most valued by users and those that were missing.

The average length of the survey was 9.0 minutes, with a range of 5.7 to 12.3 minutes, the length of the range being conditioned by the existence of filter questions that determined the length of the survey. Fieldwork was conducted between May 24 and June 21, 2018, throughout Spain, except for the African autonomous cities of Ceuta and Melilla.

## Population

A sample of 1,695 individuals of legal age and legal residence in Spain, was randomly surveyed. Telephone calls were made through the Infobel v16 directory during different time slots and days of the week. In order to guarantee adequate representativeness, the selection took into account sociodemographic profile characteristics, establishing quotas for sex, age and habitat –the capital city and at least one city of each size were represented in all provinces–, with a confidence level of 95% and a margin of error of ±2.45 for the sample as a whole (see Supplementary materials_1).

## Analysis and interpretation

The information collected was stored in a coded database following the survey objectives and design. Preliminary results were corrected, standardized and recoded in some variables in order to facilitate their statistical treatment. Weightings were applied to ensure representativeness at the state level –according to Spanish national statistics institute (INE) data–. Finally, a detailed analysis was carried out using the computer packages SPSS™ and STATA™, from which the general opinions of the group of respondents were extracted, ranked, and their contribution to the research objectives was assessed.

The type of analysis carried out is descriptive and of detection of critical profiles based on the sociodemographic variables previously announced in the objectives, with the aim of examining in which aspects differences are detected between the services offered and the demands of the users.

## Ethical considerations

On the absence of elements of ethical consent of personal data, in the case of this research no data

were used that would allow the identification of the persons who participated in the research. The survey respected the existing data protection legislation in force: regulation EU/2016/679 of 27 April 2016, General Data Protection (GDPR). No personal data were collected from users without their knowledge, nor were they disclosed to third parties. The opinions and data offered by respondents were only used to conduct research; part of those results are set out in this article. Once the processing has been completed, the data is only kept for the time necessary to fulfill the purpose for which it was collected and the publication of the data does not include any personal data.

The company that carried out the fieldwork accessed contact data stored in databases and, after establishing communication with each person, announced the type of study in which they were going to participate and the source of funding for the study. In addition, they were informed that their responses would be treated according to data protection legislation. Before starting the questions, the participant verbally expressed his or her agreement and willingness to participate. Specifically, the text read by the interviewer was as follows: "I am an interviewer for the company ..., dedicated to opinion studies, and we are conducting a survey on regional public health services financed by the Ministry of Economy and Competitiveness. In compliance with current legislation on data protection, we would like to count on your collaboration, and we guarantee the complete anonymity of your opinions".

No financial compensation was made to respondents.

## Results

## Who accesses eHealth portals?

Given the objectives of the research, the questions that were asked consisted of filters that determined two profiles: Internet users and users of e-Health services. The first group comprises the second, but the latter is the only one who knows and can assess the situation of e-Health services.

However, it is not only the opinion of those who use the services that minds. It is even more important, if possible, to identify the reasons why those who have the necessary means and knowledge to make use of these services do not do so.

Specifically, the first question makes it possible to distinguish between those who browse and those who, in addition, access the main entry point for e-Health services in Spain, the regional web portal.

The first result to take into account is that still more than half of the population had never accessed

their regional health portal (53.22%).

When analyzing the data according to the variables used as descriptors (age, sex, education and habitat) it was observed that, taking into account the age factor, the youngest (between 18-24 years) and those over 65 are the groups who report connecting less to the health portals: specifically, 61.07% and 67.69%, respectively, do not do so. On the other hand, 32.18% of Internet users frequently connect to these portals. Among these, the 25 to 39 and 40 to 65 age groups stand out, with 33.60% each.

There are no major differences by sex, but it should be noted that women use these services frequently (34.05% vs. 30.39%) and that they are slightly more frequent users of e-Health services than men (51.58% vs. 54.77% who had never accessed them).

There were differences regarding education level: those with university degree reported more frequent access to these services (37.13%); 29.90% of those with only secondary or primary education did so, and 28.41% of those with only secondary or primary education did so. Of those with only secondary education, 56.36% said they had never accessed these services, and this percentage increased to 61.36% among those with primary education; on the other hand, 53.96% of those with university education said they had connected at least once.

Finally, by habitat, there are differences between residents in municipalities with more than 25,000 inhabitants and those with smaller populations (less than 5,000 and between 5,000 and 25,000 inhabitants): the former access it more (51.77% have never accessed it, compared to nearly 56% of the other two groups) and more frequently (33.48% use it regularly compared to 30% of the other groups).

As anticipated, it is as important for this study to know the motives of those who have accessed it as of those who have not. For the latter, a specific block of questions was defined. The main purpose was to find out the reasons for not having visited their respective health portal. To this end, a closed set of options was defined and the possibility of open answers was enabled (see Supplementary materials_2).

The main reason alleged for not visiting health portals is that this need is covered by traditional means (46%). This figure shows that the youngest people (57.69%) give this reason as opposed to the other groups (46%, 44% and 40%). The next reason is disinterest, reported by 27% of those consulted, but reaching 32.5% among older people.

Other alleged reasons for not visiting the portals are the fact of having alternative coverage, which

reaches 9% of the total and 15% among the elderly; and the difficulties of using the network and this type of portals, a reason stated by 4.5% of all Internet users and non-users of health portals.

Other reasons given to a lesser extent were the perceived unreliability of the information provided by the websites, and the lack of privacy and security on the Internet, with figures of less than 4% of the total responses.

Considering the gender variable, the main differences were that men reported 7.33 points more (49.55% vs. 42.22%) to meet their needs through traditional channels as a reason for not using the Internet. Women show more diversity in their reasons for non-use: specifically, 6.67% (compared to 2.23% of men) point to the difficulty of use as an obstacle, but there are also differences compared to men in the availability of other types of health care and in the consideration that information is not reliable.

Regarding educational level, several observations stand out. First, the association between university degree and the availability of alternative healthcare, with a significant difference with respect to the other educational levels (13.19% compared to 2.17% in primary studies and 7.44% in secondary studies).

Among those with primary education, significant differences were also observed with respect to the average. A total of 15.22% highlighted the difficulty of use, and 8.7% the lack of confidence in the information. Likewise, the percentage of non-response (6.52%) is observed. In addition, up to 30.43% stated that they had no interest in this type of service format.

To complete the description of results by level of education among those with secondary education, it is worth noting that half (50.00%) say that their needs are covered by traditional means, while 4.55% say they have difficulties in using this type of platform.

Finally, reviewing the data according to habitat, few differences can be seen, highlighting a greater lack of interest in these portals in larger cities (29.30% compared to about 25% in municipalities of up to 25,000 inhabitants).

## What are eHealth portals accessed for?

The other questions were only asked of those who accessed the health portals. To begin with, it was necessary to determine the reasons for accessing, and determine the most and least frequented services. Data collected (see Supplementary materials_3) show that visits to the regional portals are

mainly aimed to perform or access some e-Health service or procedure, whether we take into account accesses in general (63.16%) or the most recent ones (68.67%).

The next reason for visiting the portals was to search for information, with 29.28% in general and slightly less in the last access (26.96%).

The third reason would be to try to contact health service: 5.43% of the general access and 2.91% if the last access is taken into account. After these there would be consulting the employment exchange (0.82% in general and 0.73% in the last access), and other minor reasons.

In terms of age, there is a clear difference between the younger age groups (18-24; 25-39) and the older ones (40-65; 65+): the former show a wider distribution of actions on the web portals compared to the latter.

As specific data, it is worth highlighting the 10.14% of people in the 18-24 age group who usually access these portals to communicate with the health service. However, in the last access figure drops to 1.64% and the 8.33% of people in the older age group who accessed for this purpose the last time they had accessed their health portal is surprising.

There are no remarkable differences regarding sex. The same is true for the educational factor, where it can only be noted that people with primary education never access to consult the employment exchange (something linked to the level of training generally required for most jobs in this sector). Otherwise, there are no major differences.

Finally, in terms of habitat, there are again elements to be highlighted. Returning to the search for job offers, the percentage of people who access for this purpose are residents of large cities; there is no access by people from intermediate or small habitats at any time (neither in general, nor on the last occasion).

Another element to highlight is the significant percentage of access to communicate with the health service in small municipalities (up to 5,000 inhabitants): 13.51% do so in general, and 7.58% in their last access. These data are almost three times higher than those immediately following (4.72% for general access and 2.48% for last access).

## Which services are most used?

Identifying the most used services and their frequency of utilization (see Supplementary material_4) was the next factor to be analyzed.

The first element to note is that even among those who do use eHealth services, almost all show an extremely high level of non-use. The exception to this rule is the booking or rescheduling of medical appointments. On average, and with the exception of the previous service, almost 80% (79.96%) of the remaining services have never been used by users. Medical appointment, on the other hand, shows almost the opposite situation, and has been used at least once by 72.48%.

Among the next most used services were the following: "Health card management" (28.04%), "Medical history consultation" (20.37%), "Exams results management" (20.22%), "Contact with health professional" (17.80%); and finally "Request change of physician" (13.76%).

The only service that is used frequently is the request or change of medical appointment, which 21.28% of people use on a very regular basis. However, this common use of e-Health services is not as widespread. The remaining services hardly show frequent users and their pattern of use is much more sporadic. It is also observed that usual or daily use is practically nonexistent, barely exceeding 2% of any of the patterns of access to the services.

With respect to age, patterns of access can be seen in which the percentage of use decreases as the age of the person interviewed increases. This is the case with health card management, requesting a change of physician and contact with a health professional. For test results management and consulting medical background, the pattern is the same for the first three ranges, but those over 65, in this case, show higher percentages of use than some of the previous bands.

Finally, with regard to the main e-Health service, booking or rescheduling a medical appointment is especially requested by people between 40 and 65 years of age (75.19%), followed by those between 25 and 39 (72.96%), those between 18 and 24 (67.24%) and finally those over 65 (52.00%).

There are minor differences between the sexes, but there is a significant imbalance in the service related to the management of the health card, a service that women perform 8.27 points less (23.75% compared to 32.03% of men). In the other services, the figures are very even, although the pattern is slightly higher for men than for women.

For educational level, when considering the ratings of people accessing e-Health services, the picture changes with respect to that described in the previous table. Three characteristics may be observed: the first is that the levels of use are more equal; the second is that people with primary education continue to be the least likely to use the services (76.39% never use these services); and finally, on

average, 71.46% of users with university education and 69.98% of those with secondary education do not access these services.

Finally, regarding the weight of the habitat factor, it may be observed that in municipalities with less than 5,000 inhabitants, 68.94% have never used the services. This percentage rises to 70.26% in municipalities with larger populations and reaches its maximum value (75.50%) in towns with between 5,001 and 25,000 inhabitants.

In turn, it is the smaller municipalities (less than 5,000 inhabitants) that make greater use of services such as health card management (35.94%), medical history consultation (28.13%) or test results management (25.40%).

## What are the most important services for the user?

Next, beyond the use of the service, the respondents were asked about these services, but on this occasion to state the importance they attributed to them, regardless of whether or not they made use of the services.

With regard to the importance attached by users to the services offered by the health portals, whether they have used them or not, information was collected through the question "*And how important is each of them to you*?" (see Supplementary material_5).

Regardless of the number of services used, they tend to consider all the services offered to be very important: more than 80% of the sample, on average, give all the services presented some or a great deal of importance (63.18% "*lots of*" and 17.55% "*some*" importance), while the percentage of people who give them "little" or "no" importance does not exceed 10% in each case.

When analyzing each service separately, requesting and managing appointments is the most highly valued service (90.32%), followed by consultation to exams results (84.24%); health card management (81.14%), contact with health professionals (79.73%), consultation of medical records (76.89%) and, finally, requesting a change of physician (72.05%).

By age, the importance attributed to the range of services decreases with increasing age.

By sex, there were hardly any differences between women and men in terms of the importance attached to services: 81.74% and 79.77% respectively.

Regarding the level of education, it can be seen that, as this increases, so does the importance given to all the services offered: thus, people with university studies give an average of 86.16% importance to all the services, compared to 76.49% of people with secondary studies, and 74.19% with primary

studies.

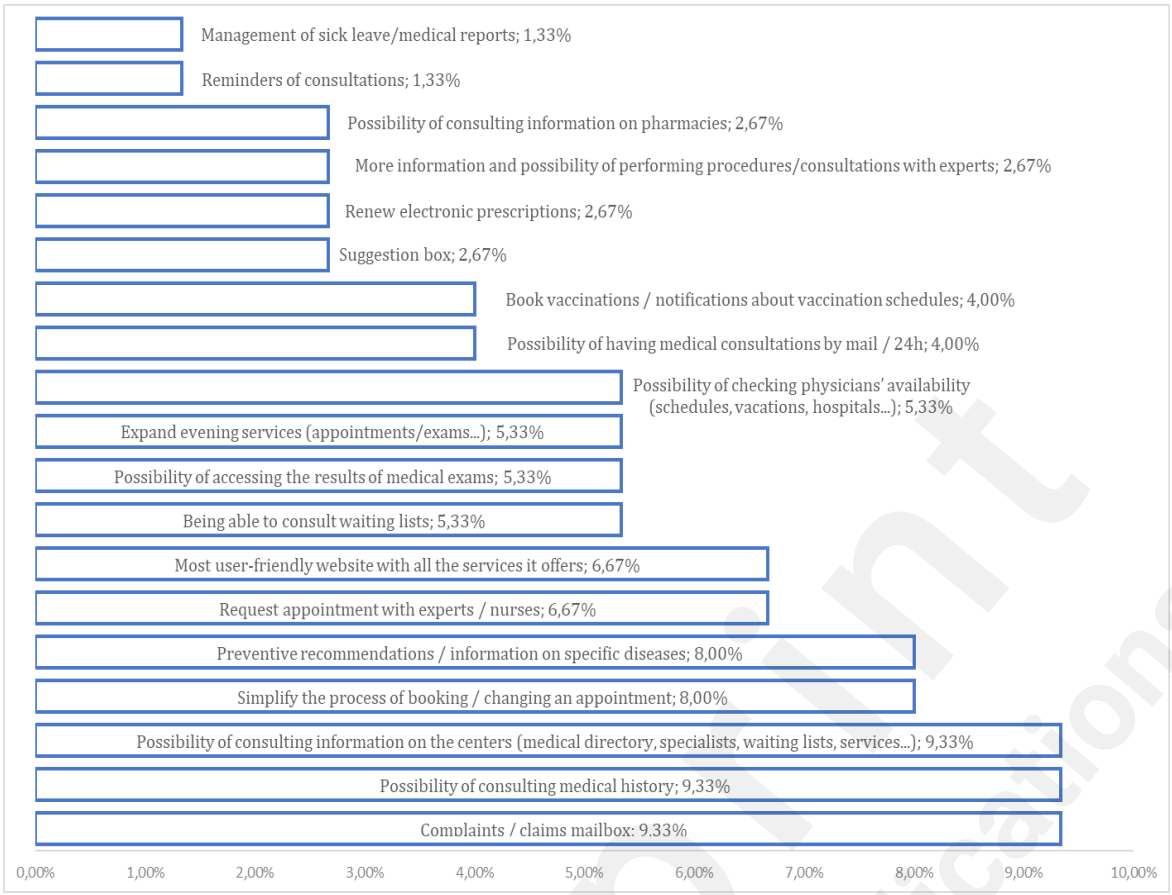
Focusing on habitat, there is no clear pattern. On average, people residing in municipalities with between 5,001 and 25,000 inhabitants are those who attach most importance to the services offered as a whole (82.34%), followed by people in municipalities with more than 25,000 inhabitants (80.54%) and municipalities with less than 5,000 inhabitants (78.88%).

## What do users demand and what do eHealth portals offer them?

Finally, in order to try to answer the main objective of this study (*what do users expect and what does the National Health System offer them*?), the population surveyed was asked about the other services they would like to find in their regional health portals. To this end, a first question was established which filtered out, among the users of e-Health services, those who considered that there were services they would like to receive. Among users surveyed, 16.52% were willing to make new service demands to autonomous websites.

When this question was asked in an open-ended manner, the results shown in Figure 1 were obtained.

**Figure 1: Other aspects and services demanded by users and not currently offered in regional health portals.**




**Source: own elaboration**

Based on the above data, three requests share the highest frequency (9.33%): availability of a mailbox for complaints and claims, the possibility of consulting medical records and the availability of more detailed information on the centers (medical directory, centers, waiting lists, etc.).

Other outstanding requests (8.00%) were to simplify the procedures for using certain services, such as changing doctors or consulting medical records; to have more specific and extensive information on certain diseases; to have information on centers, professionals and schedules, vaccination schedules, information on pharmacies; to be able to schedule appointments with experts or consult waiting lists.

Some of these demands may be covered by the offer made by some regional health services (for example, requesting an appointment with a nurse) or even be included in the portfolio of services, although users are not aware of them or do not have the appropriate permissions to access them (consultation of medical records, access to test results, complaints and suggestions mailboxes).

In turn, as can be seen in Figure 1, the population consulted indicated more than twenty services or information content less frequently than the previous ones, including: preventive recommendations; making medical consultations by e-mail; renewal of electronic prescriptions; management of sick leave reports; suggestion box or appointment reminders.

It should be borne in mind that the demands expressed may be conditioned by prior expectations, which, in turn, may tend to be closely related to certain services provided in other regions and for which they have references.

Likewise, as has been observed, many of the demands are not so much for new services or information as for simplification of procedures, improvements in access, ease of use, and search for services,

The small number of respondents who proposed demands, despite identifying shortcomings in the offer, could be due to the fact that many of the aspects surrounding e-Health services have technical connotations (interoperability of systems; collection and transmission of images; teleconsultation and telecare; remote monitoring using wearables) that would make it difficult for people with a low or medium level of education to make their demands explicit.

## Discussion

New applications of telemedicine are being discovered all the time. Devices such as cell phones are replacing personal computers (PCs) as a connectivity support, so that mHealth is enjoying significant development in recent years, mainly in preventive health [37,38]. It is believed that it may also have great potential for monitoring patients and chronic diseases [39,40] and in health promotion and the collection of useful data for the system and for healthcare itself [41].
Other studies also report the good results that online programs are achieving in mental health [42], especially among professionals and younger users [43] or focused on self-isolating patients [44].

In preventive actions, screening, diagnosis, treatment or follow-up, e-Health resources have come to be used extensively and on a daily basis [45], which has contributed to an improvement in the follow-up and information offered to users.
The above advances are known to some users; as they become known and disseminated, their demand should increase. For this reason, the conception of e-Health services is an important challenge for policy designers and implementers who should not consider the needs and demands of the system's users in their decision-making processes [46].
In addition to the adequacy of supply to demand and the satisfaction of expectations, another relevant condition to encourage greater use of online health services is the improvement of security. This is an aspect repeatedly considered to be the element of greatest concern among

patients who have used online health services, especially when taking into account the management of data collected within the Digital Health Record (DHR). Users argue that access to DHRs should be more protected [47] and should be limited exclusively to medical staff and not extended to other healthcare professionals, such as nurses, pharmacists or laboratory personnel. However, considering the results, it is also important to ensure that users are aware of and have access to their DHR, given that low levels of use may be an indication of a lack of access.

## Matching supply and demand for e-Health services

The data collected from the survey and presented in the results section show that, despite more than two decades of eHealth implementation, a sufficient match between supply and demand has not been achieved, as the results obtained show that users demand more than twenty services that they consider useful and which are not currently being provided on a widespread basis. If current dynamics and trends continue, it would be difficult to achieve such a match, which seems to require a specific approach by eHealth policy makers and implementers.

Whatever technology is considered, its introduction into a healthcare system should be preceded by an evaluation, with well-defined criteria to demonstrate its efficacy, safety and quality, and even supported by cost-effectiveness or efficiency criteria. These criteria imply the need to generate evidence showing feasibility, usability, acceptability and cost, until other formal and methodologically consistent studies that can provide evidence on cost-effectiveness are conducted [9].

More investment is needed in digital infrastructure, greater interoperability of the system, incentives for health professionals to promote its use, and a focus on people and outcomes. Simultaneously, services should designed around users and their needs, medical teams need to be equipped with new skills –especially around digital health– to better respond to patients' needs [48]and increase the incorporation of stakeholders in the design of online services [49]. Despite the fact that a large part of telemedicine is going to target people with disabilities, telemedicine is not designed with those people in mind [50].

Moreover, some of the errors or shortcomings observed with respect to access and usability of services can be partially corrected by continued technological advances [51,52].

Advances should be accompanied by progress in terms of effectiveness, efficiency, accessibility, quality and equality of treatment and greater capacity to measure results [53], which requires consensus for implementation, but also leadership, since the lack of budget and qualified personnel, the excessive discretion of professionals during the transition between the old and the new care system [54] may generate rejection and resistance on the part of users. Thus, if responsible technologies are to be designed, at the service of the citizenry as a whole, it will be necessary to integrate into the debate the various actors involved in digital health and to establish mechanisms for monitoring and public scrutiny that provide transparency and legitimacy to these processes [55].

## Supply and demand for e-Health and the digital divide

The social and digital divide is still in force and has more and more edges. The gap between the excluded and the included is widening [56] and this fragmentation of the system leads to unequal access and coverage [57], to a possible replacement of medical staff by managers, administrative and computer personnel [58], which gradually dehumanizes the user and the medical practice. Even the professionals recognize the importance of establishing deontological criteria for e-Health [59].

As some authors point out [60], , what the digitalization of healthcare based on exclusive capitalist criteria puts at stake is the survival of a healthcare model that enjoys a broad consensus, which has served to eradicate many diseases and has significantly increased life expectancy. As Cometta (2021) points out, the introduction of new technologies in the health sector risks increasing inequalities and endangering democracy by promoting forms of monitoring and social control [61–64].

If market logics are not brought under control and e-Health is not humanized to make it more social and inclusive, the health professions, as a space for inclusion and solidarity, as they are known today, risk disappearing.

## Digital health in the post-COVID-19 era

It is clear that the pandemic caused by COVID-19 has been a major boost for telemedicine in particular and e-Health in general. Teleconsultations increased dramatically [65] , which contributed significantly to reducing hospital pressure and the overload on healthcare systems, by detecting, diagnosing and monitoring COVID-19 from home [28,29] and also helping to reduce the risk of contagion [27].

In that period, national health services in different countries adopted telemedicine solutions as an alternative to face-to-face consultations. Some systems were not ready, as professionals were not trained/informed and had difficulties in accessing users' medical records, due to problems of interoperability of systems and apps, lack of training, the time consumption required to use e-Health or the prioritization of the search for immediate returns on investment [66].

It could be expected that some of the services demanded by users would be implemented during the pandemic caused by COVID-19, either because of the trend evolution of the digitalization of healthcare, or because the pandemic could represent an important qualitative and quantitative leap in the use of technological tools to address the different challenges that the pandemic poses to health systems as a whole [67]. However, it can be seen that what is happening is rather an intensification of the use of the services that e-Health was already offering, and which were included in the survey, rather than the implementation of new services in this way [68].

The pandemic has served to reduce certain resistance to the use of technology in attention and care. However, as observed in the results and in other research, users and some professionals continue to prefer face-to-face consultations, especially by those users who are less familiar with technology and by those professionals who fear that medicine will become dehumanized and that professional practice will be reduced to the mere collection of data for biomedical studies [61].

## Limitations of this study and proposals for improvement

The present work is a rigorous and well-documented study with first-rate information and data, both because of the research technique used and the extensive review of the literature carried out; nevertheless, it is believed that there are some aspects that could be improved.

Thus, it is believed that, in addition to the survey, it would be advisable to complement the quantitative data obtained with other qualitative information that could be obtained through other techniques such as interviews or focus groups.

It would also be convenient to collect and analyze in greater detail the e-health services offered in other countries, by including them in a database that would then allow us to compare the different health services and see the differences between them and also the differences in use and valuation by users or citizens.

## Future lines of research

Since we are dealing with user demands and expectations in relation to e-Health services on the one hand, and the necessary and constant evolution of the supply of these services on the other, it would be necessary to periodically update this information in order to be able to adapt the supply of these services to the demands of the population.

Given that users may not be aware of all the potential that new technologies offer in the provision of online health services, it would be a good idea to reflect on these potentialities and pass them on to users so that they can evaluate those services that seem most useful for their needs.

It would also be necessary to look more closely at the services offered and others that could be demanded if they were offered, and to see what are the reasons why these services are not being offered.

## Conclusions

The survey data show that the supply of eHealth services is not adapted to or does not meet the demands of users. It is also clear from these data that the services offered are widely known and well appreciated by users, although not all of them are used with the same frequency or intensity. This insufficient match between supply and demand for services may be due to the low or non-existent presence of users in the process of designing eHealth policies and mainly affects people with lower capacities, as they are the ones who have the greatest difficulties in covering their needs by alternative means. It might be expected that the pandemic caused by COVID-19, during which many health services were only provided telematically, would be used by eHealth to offer a wider range of services to users; however, as can be seen from the recently published literature, both in Spain and in other neighbouring countries, the range of services has not been extended during this period, but rather the use of existing services has been intensified.

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### Conflicts of interest and funding

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

### Data Availability Statement

The survey will be available in this public repository: http://www.arces.cis.es/jEstudios.jsp.

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# Supplementary Files

# Figures

What do e-health services in Spain offer and what are the demands of users? A national survey.

**Figure 1: Other aspects and services demanded by users and not currently offered in regional health portals.**


**Source: own elaboration**

# Multimedia Appendixes

Supplementary materials 1.
URL: http://asset.jmir.pub/assets/77ac63f6cbdfa4e5dd9055b953074f84.png

Supplementary materials 2.
URL: http://asset.jmir.pub/assets/d0fe417c7a503de42ba76779aa492fa3.png

Supplementary materials 3.
URL: http://asset.jmir.pub/assets/c3e24867b9045ba7910bbf915e10f3f0.png

Supplementary materials 4.
URL: http://asset.jmir.pub/assets/f30caa48435b2e7d95fcbfef5debf0ff.png

Supplementary materials 5.
URL: http://asset.jmir.pub/assets/bce4ba42d984acb3ac83ba42e56cc1ec.png