Characteristics of citizens and their use of teleconsultation in Primary Care in the Catalan public health system before and during COVID: Retrospective Descriptive Cross-Sectional Study

Oscar Solans, Josep Vidal-Alaball, Pasqual Roig Cabo, Núria Mora, Ermengol Coma, Josep Maria Bonet Simó, Eduardo Hermosilla Pérez, Francesc Saigí-Rubió, Carmen Olmos, Jordi Piera-Jiménez, Mercè Abizanda González, Francesc López Seguí

Submitted to: Journal of Medical Internet Research
on: March 09, 2021

Table of Contents

Characteristics of citizens and their use of teleconsultation in Primary Care in the Catalan public health system before and during COVID: Retrospective Descriptive Cross-Sectional Study

Oscar Solans[1, 2] MD, MSc; Josep Vidal-Alaball[3, 4, 5] MD, MPH, PhD; Pasqual Roig Cabo[6] MD; Núria Mora[7] BSc; Ermengol Coma[7] MD, MPH; Josep Maria Bonet Simó[6] MD; Eduardo Hermosilla Pérez[7, 8] BSc; Francesc Saigí-Rubió[9, 10] MD, PhD; Carmen Olmos[1] MD, MSc; Jordi Piera-Jiménez[2, 11, 12] MSc; Mercè Abizanda González[13, 14] BSc; Francesc López Seguí[6, 15] PhD

[1]Health Department Catalan Ministry of Health Barcelona ES
[2]Digitalization for the Sustainability of the Healthcare System Sistema de Salut de Catalunya Barcelona ES
[3]Health Promotion in Rural Areas Research Group Gerència Territorial de la Catalunya Central Institut Català de la Salut Sant Fruitós de Bages ES
[4]Unitat de Suport a la Recerca de la Catalunya Central Fundació Institut Universitari per a la recerca a l'Atenció Primària de Salut Jordi Gol i Gurina Sant Fruitós de Bages ES
[5]Faculty of Medicine University of Vic - Central University of Catalonia Vic ES
[6]Northern Metropolitan Primary Care Directorate Institut Català de la Salut Badalona ES
[7]Primary Care Services Information Systems Institut Català de la Salut Barcelona ES
[8]Jordi Gol i Gurina Primary Health Care Research Institute Foundation Barcelona ES
[9]Universitat Oberta de Catalunya Faculty of Health Sciences Barcelona ES
[10]Interdisciplinary Research Group on ICTs Barcelona ES
[11]Servei Català de la Salut Barcelona ES
[12]Open Evidence Research Group Universitat Oberta de Catalunya Barcelona ES
[13]Health Department eHealth Unit Barcelona ES
[14]Pere Virgili Health Park Primary Care Management Control Barcelona ES
[15]CRES Pompeu Fabra University Barcelona ES

Corresponding Author:
Josep Vidal-Alaball MD, MPH, PhD
Health Promotion in Rural Areas Research Group
Gerència Territorial de la Catalunya Central
Institut Català de la Salut
Carrer Pica d'Estats, 36
Sant Fruitós de Bages
ES

Abstract

Background: eConsulta (asynchronous and two-way teleconsultation in Primary Care) is one of the most important telemedicine developments in the Catalan public health system, a service that has been heavily boosted by the outbreak of the pandemic. It is vitally important to know the characteristics of its users in order to be able to meet their needs and have an idea of who is being covered (and who is not) through this service in a context where there is less accessibility to the health system.

Objective: Undertake a descriptive analysis of the profile of the citizens who use the tool and the type of use they make of it to gain an understanding of the elements that characterize their decision to use it, making a distinction between those who used it before and those who have used it since the outbreak of the COVID-19 pandemic

Methods: Descriptive observational study based on administrative data. The study differentiates between the pre and during COVID periods, taking as the cut-off point the day the state of emergency was declared in Spain (13 March 2020), and between users who send messages and those who only receive them. The main study variable is the use of the eConsulta service.

Results: The pandemic has resulted in almost triple the number of unique users in just the first three months observed (220,043/76,598, 2.87). Since the start of the COVID outbreak, although users have continued to be predominantly female, they are systematically younger than before, more actively employed and with less complex pathologies for the two user profiles

analysed. There is also a relative decrease in the number of conversations initiated by higher-income urban citizens and an increase in users in rural areas.

Conclusions: This study identifies a change in the profile of citizens who use the eConsulta tool, which as a result of the COVID-19 pandemic now has a profile similar to that of the average citizen: actively employed, with low complexity of pathology and who receives more messages proactively from the health professionals through eConsulta. The pandemic has helped to generalize the use of telemedicine as a tool to compensate to some extent for the decline in face-to-face visits, especially in younger citizen profiles.

(JMIR Preprints 09/03/2021:28629)
DOI: https://doi.org/10.2196/preprints.28629

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Characteristics of citizens and their use of teleconsultation in Primary Care in the Catalan public health system before and during COVID: Retrospective Descriptive Cross-Sectional Study

Author	Affiliation	ORCID	Grade
Oscar Solans	Health Department, Catalan Ministry of Health, Barcelona, Spain	0002-3822-9869	MSc, MD
Josep Vidal-Alaball *	Health Promotion in Rural Areas Research Group, Gerència Territorial de la Catalunya Central, Institut Català de la Salut, Sant Fruitós de Bages, Spain. Unitat de Suport a la Recerca de la Catalunya Central, Fundació Institut Universitari per a la recerca a l'Atenció Primària de Salut Jordi Gol i Gurina, Sant Fruitós de Bages, Spain. Faculty of Medicine. University of Vic - Central University of Catalonia, Vic, Spain	0002-3527-4242	MD, PhD
Pasqual Roig Cabo	Northern Metropolitan Primary Care Directorate. Institut Català de la Salut	0002-7526-7899	MD
Núria Mora	Primary Care Services Information Systems (SISAP). Institut Català de la Salut		BSc
Ermengol Coma Redon	Primary Care Services Information Systems (SISAP). Institut Català de la Salut	0001-8000-3321	MPH, MD
Josep Maria Bonet Simó	Northern Metropolitan Primary Care Directorate. Institut Català de la Salut	0002-7981-5880	MD
Eduardo Hermosilla Pérez	Primary Care Services Information Systems (SISAP). Institut Català de la Salut Jordi Gol i Gurina Primary Health Care Research Institute Foundation (IDIAPJGol)	0002-3031-0304	BSc
Francesc Saigí-Rubió	Open University of Catalonia (UOC), Faculty of Health Sciences, Barcelona, Spain Interdisciplinary Research Group on ICTs, Barcelona, Spain	0001-9616-1551	MD, PhD
Carmen Olmos	Health Department, Catalan Ministry of Health, Barcelona, Spain	0001-7664-8864	MSc, MD
Jordi Piera-Jiménez	Digitalization for the Sustainability of the Healthcare System (DS3), Sistema de Salut de Catalunya, Barcelona (Spain) Servei Català de la Salut, Barcelona (Spain) Open Evidence Research Group, Universitat Oberta de Catalunya, Barcelona (Spain)	0001-6471-9979	MSc,
Mercè Abizanda González	Health Department. eHealth Unit, Barcelona, Spain Pere Virgili Health Park. Primary Care Management Control, Barcelona (Spain)	0002-7360-0862	BSc
Francesc López Seguí	CRES - Pompeu Fabra University, Barcelona (Spain) Northern Metropolitan Primary Care Directorate. Institut Català de la Salut, Barcelona, Spain	0003-0977-0215	PhD

* Corresponding author: Josep Vidal-Alaball

Abstract

Background: eConsulta (asynchronous and two-way teleconsultation in Primary Care) is one of the most important telemedicine developments in the Catalan public health system, a service that has been heavily boosted by the outbreak of the pandemic. It is vitally important to know the characteristics of its users in order to be able to meet their needs and have an idea of who is being covered (and who is not) through this service in a context where there is less accessibility to the health system.

Objective: To analyze the profile of the citizens who use the tool and the type of use they make. To gain an understanding of the elements that characterize their decision to use it making a distinction between those who used it before and those who have used it since the outbreak of the COVID-19 pandemic.

Methodology: A descriptive observational study based on administrative data was performed. The study differentiates between the pandemic era and the period preceding to it, taking as the cut-off point the day the state of emergency was declared in Spain (13 March 2020), and between users who send messages and those who only receive them. The main study variable is the use of the eConsulta service.

Results: The pandemic has resulted in almost triple the number of unique users of the teleconsultation service in just the first three months observed up to to 33.10 visits per 1000 inhabitants and month. . Since the start of the COVID outbreak, although users have continued to be predominantly female, they are systematically younger, more actively employed and with less complex pathologies for the two user profiles analysed. Users receive more messages proactively

from the health professionals through eConsulta. There is also a relative decrease in the number of conversations initiated by higher-income urban citizens and an increment in users in rural areas.

Conclusion: The pandemic has helped to generalize the use of telemedicine as a tool to compensate to some extent for the decline in face-to-face visits, especially in younger citizen profiles. Telemedicine has made it possible to maintain contact between the citizen and the healthcare system in a context of maximum complexity.

Keywords (MESH): teleconsultation; primary care; remote consultation; telehealth; COVID-19; econsultation.

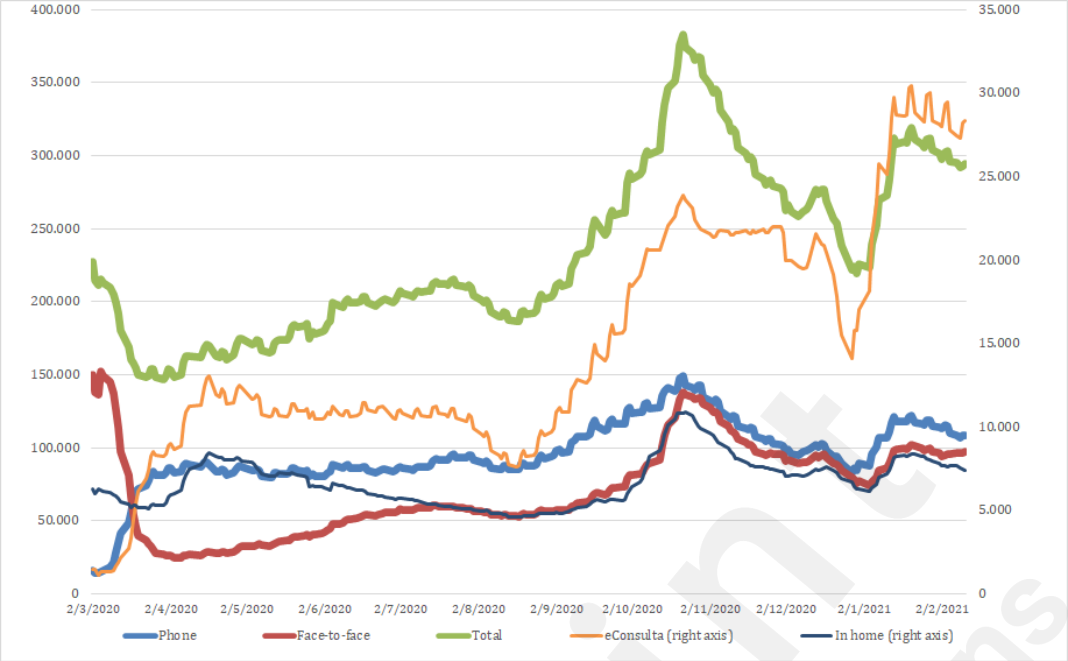
1. Introduction

The eConsulta tool, in operation since 2015, is one of the most important telemedicine developments in the Catalan public health system. It is an asynchronous and two-way teleconsultation tool between health professionals and citizens that is part of the patient portal of the public health system, a platform that also allows citizens to securely access their personal health information stored in the Personal Health Folder and carry out certain procedures. This service was operational only in the context of primary care [1,2] until it recently began to be expanded to hospital care.

According to data from the Ministry of Health, from its inception in October 2015 to 22 February 2021, a total of 1,061,995 citizens (out of a total population of 7.7 million people) and a total of 15,569 Primary Care health professionals (out of about 19,000 who could potentially use it) have carried out 4,263,665 econsultations. This service is a new model of relating to healthcare professionals, more practical for users and more efficient for the health system [3,4]. In addition, it empowers citizens and promotes teleworking among healthcare professionals, an essential factor in the context of the current pandemic, improving their work-life balance [5]. In recent years, even before the pandemic, the use of the tool had grown significantly, both by citizens and professionals, although it still only represented a very small proportion in relation to the number of face-to-face visits [6], a situation very similar to that of other countries [7,8].

The outbreak of the COVID-19 pandemic and the initial need to reduce the risk of infections by preventing patients from physically going to health centres has led to a change in model that has promoted non-face-to-face care. The majority of countries have responded to this need by making significant efforts to implement both synchronous and asynchronous telemedicine [9 - 12]. The demand for teleconsultation has incremented enormously around the world: for example, in France the number of teleconsultations multiplied by 50 during the weeks following the outbreak of the pandemic [13 - 14]. In Catalonia, this has resulted in a very significant increment in the daily number of teleconsultations, although well below telephone consultations (Figure 1).

Figure 1: Primary Care Daily Visits, per type. 7-days moving average. March 2020 - February 2021.



Source: SISAP. Does not include weekends or holidays

Despite the fact that some studies question the efficiency of teleconsultations between primary care professionals and citizens [15], several studies point out that the eConsulta tool helps to reduce face-to-face visits [4,6], which may be one of the drivers of its growing use among users. Regarding professionals, a previous analysis concludes that doctors who use eConsulta are 45-54 years of age, score higher than the 80th percentile on the quality of care index, have a high degree of accessibility, are involved in teaching, and work on a health team in a high socioeconomic urban setting [16]. With regard to users, it is vitally important to analyse their characteristics in order, on the one hand, to provide a service that is appropriate and adjusted to their needs and, on the other hand, to have an idea of who is being covered by this service (and who is not) during the COVID period. Previous studies show that women use online consultation more than men (64.7% vs. 35.3%) and the average age is 39 years [15]. Others have identified interesting patterns, such as the fact that men tend to perform more teleconsultations, while women perform more online consultations. [17] In Catalonia, however, there is no evidence to determine the profile of a typical citizen or their use of the tool.

In this context, the aim of this article is to offer a descriptive analysis of the use of eConsulta before and during the COVID-19 pandemic and the profile of the citizens who use it in order to gain an understanding of the elements that characterize their decision to use the tool and assess who is being covered through this service in a context where there is less accessibility to the health system.

2. Methods

This is a descriptive observational study based on administrative data from the Catalan Health Institute (ICS), the main provider of primary care services in Catalonia (serving 74% of the Catalan population). The analysis period is from 1 June 2018 to 15 June 2020. Data regarding all patients assigned to an ICS Primary Care Team (PCT) during the analysis period were analysed. The study population was defined as all living patients as of December 2019 (5,844,804). All these citizens can use the tool with the prior authorization of the healthcare professional. The analysis, differentiates between the pandemic era (from 13 March 2020, the day the state of

emergency was declared in Spain, to 15 June 2020) and the period preceding to it (before 13 march) and between users who send messages and those who only receive them.

The main study variable is the use of the eConsulta service. “Use” is defined when any messages are sent between a professional and a citizen during the analysis period. "Non-use" is defined when no messages have been sent sent. Independent variables have been considered: age, gender, socioeconomic level of the centre, type of centre (rural or urban), GMA indicator (Adjusted Morbidity Group, a population grouping, which allows the population to be classified into excluding groups according to their multimorbidity [18]), a binary variable identifying the low-income immigrant population, the MACA (patient with advanced chronic diseases) indicator [19], the PCC (Complex Chronic Patients) indicator, and the level of pharmacy coverage. In addition, we assessed the socioeconomic status using the validated MEDEA deprivation index, an indicator that takes into account, among others, the variables of income, occupation and level of studies [20]. We categorized this index into quartiles where the 1st and 4th quartiles are the least and most deprived areas, respectively. Rural areas were categorized separately and were defined as areas with less than 10,000 inhabitants and a population density lower than 150 inhabitants/km2.

Continuous variables are presented with mean and SD, variables with a non-normal distribution are presented with median, minimum and maximum values. Categorical variables are presented with the absolute and relative frequency of each category. For the comparison of two categorical variables, the Fisher test and the Chi-Squared test were used, for the comparison of two numerical variables the t-test was used and in where there were more than two variables, the ANOVA test. A significance level of 5% was set. The data was analysed using R version 3.4.3 (R Foundation for Statistical Computing, Vienna, Austria).

3. Results

Table 1 shows the characterization of citizens who use the service, broken down according to whether they have started a conversation or, alternatively, only receive messages, for the pre and during COVID-19 periods. The results show that the profile of the typical user who started a conversation in the pre-COVID era was female (58%), on an average 49.84 years of age, with a GMA of 2, coming mostly from an urban area (81%). Also, the profile is slightly older, more male, and more rural for users who only receive messages. When we look at the profile according to the MEDEA deprivation index, we see that since the outbreak of COVID, there has been a decrease in the percentage of conversations initiated by higher-income urban citizens and an increment in the proportion of users from rural areas.

Since the start of the COVID outbreak, users have continued to be predominantly female but are systematically younger than before for the two user profiles analysed. An increment can be seen in the percentage of use of eConsulta (especially in the higher number of messages received from the healthcare professional) in those population profiles that are more actively employed and have fewer chronic diseases. We see, therefore, a group of working-age citizens, who did not use to go to the doctor, and who, when they have had to go, have preferred the non-face-to-face channel.

Table 1: Characteristics of citizens who use eConsulta (mean, SD) (link to the data table)

Variable		Period	Has initiated a conversation	Non user	Only receives
Number messages (mean, (SD))		Pre COVID	1.89 (0.39)	NaN (NA)	1.06 (0.31)
		During COVID	1.70 (0.48)	NaN (NA)	1.02 (0.17)
Number of eConsultions (mean, (SD))		Pre COVID	4.00 (5.08)	NaN (NA)	1.31 (0.75)
		During COVID	3.19 (3.05)	NaN (NA)	1.83 (1.43)
Age		Pre COVID	49.84 (17.06)	42.67 (23.12)	50.71 (16.16)
		During COVID	44.96 (20.04)	42.68 (23.22)	45.02 (15.82)
Gender (Female)		Pre COVID	33,096 (58.58%)	2,920,933 (50.64%)	11,498 (57.19%)
		During COVID	75,892 (57.96%)	2,839,296 (50.48%)	50,339 (56.50%)
GMA	1	Pre COVID	14,164 (25.07%)	2,851,985 (49.44%)	4,597 (22.87%)
		During COVID	35,139 (26.84%)	2,810,872 (49.97%)	24,735 (27.76%)
	2	Pre COVID	24,033 (42.54%)	1,697,448 (29.43%)	8,519 (42.37%)
		During COVID	56,896 (43.45%)	1,632,369 (29.02%)	40,735 (45.72%)
	3	Pre COVID	13,382 (23.69%)	850,893 (14.75%)	5,317 (26.45%)
		During COVID	29,522 (22.55%)	820,537 (14.59%)	19,533 (21.92%)
	4	Pre COVID	4,475 (7.92%)	285,988 (4.96%)	1,548 (7.70%)
		During COVID	8,760 (6.69%)	279,505 (4.97%)	3,746 (4.20%)
Immigrant		Pre COVID	1,369 (2.42%)	789,383 (13.69%)	642 (3.19%)
		During COVID	4,836 (3.69%)	779,631 (13.86%)	6,927 (7.77%)
MACA		Pre COVID	186 (0.33%)	13,167 (0.23%)	46 (0.23%)
		During COVID	348 (0.27%)	12,886 (0.23%)	165 (0.19%)
MEDEA	0R	Pre COVID	3,222 (5.70%)	363,932 (6.31%)	1,146 (5.70%)
		During COVID	6,001 (4.58%)	357,023 (6.35%)	5,276 (5.92%)
	1R	Pre COVID	2,306 (4.08%)	331,292 (5.74%)	624 (3.10%)
		During COVID	5,965 (4.56%)	323,592 (5.75%)	4,665 (5.24%)
	2R	Pre COVID	4,989 (8.83%)	693,257 (12.02%)	1,842 (9.16%)
		During COVID	14,992 (11.45%)	672,972 (11.96%)	12,124 (13.61%)
	1U	Pre COVID	18,273 (32.35%)	1,233,124 (21.38%)	4,971 (24.73%)
		During COVID	35,771 (27.32%)	1,200,706 (21.35%)	19,891 (22.32%)
	2U	Pre COVID	7,168 (12.69%)	864,044 (14.98%)	2,906 (14.45%)
		During COVID	18,879 (14.42%)	842,841 (14.98%)	12,398 (13.91%)
	3U	Pre COVID	13,513 (23.92%)	1,190,933 (20.65%)	5,265 (26.19%)
		During COVID	31,120 (23.77%)	1,159,874 (20.62%)	18,717 (21.01%)
	4U	Pre COVID	7,023 (12.43%)	1,091,624 (18.92%)	3,350 (16.66%)
		During COVID	18,213 (13.91%)	1,067,753 (18.98%)	16,031 (17.99%)
Level of coverage	Active	Pre COVID	44,581 (78.91%)	4,262,326 (73.89%)	15,268 (75.95%)
		During COVID	108,917 (83.18%)	4,133,267 (73.48%)	79,991 (89.77%)
	Pensioner	Pre COVID	10,890 (19.28%)	1,143,779 (19.83%)	4,311 (21.44%)
		During COVID	19,233 (14.69%)	1,132,752 (20.14%)	6,995 (7.85%)
PCC		Pre COVID	1,695 (3.0%)	103,214 (1.79%)	459 (2.28%)
		During COVID	2,878 (2.2%)	101,411 (1.80%)	1,079 (1.21%)
Rural		Pre COVID	10,517 (18.62%)	1,388,481 (24.07%)	3,612 (17.97%)
		During COVID	26,958 (20.59%)	1,353,587 (24.06%)	22,065 (24.76%)

There are no p-values because they are all 0. GMA (Adjusted Morbidity Group). MEDEA (Mortality in small Spanish areas and Socioeconomic and Environmental Inequalities). SD: Standard Deviation. MACA: Patient with advanced chronic disease

In addition, the analysis of the volume of use of the tool for the pre and during COVID periods shows that the pandemic has resulted in almost triple the number of unique users in just the first three months observed (220,043 ÷ 76,598, 2.87) (Table 2). If we analyse the number of consultations in the 3 months before and after the outbreak of the pandemic, we see that the number increments from 5.61 to 33.10 visits per 1000 inhabitants and month.

Table 2: eConsulta activity, before and after the outbreak of the pandemic

	Users (citizens)	**Consultations**
Pre COVID (01/06/2018 - 13/03/2020)	76,598 (1.31%)	252,370
During COVID (13/03/2020 - 15/06/2020)	220,043 (3.76%)	580,496

Of these consultations, it can be seen that the proportion of conversations initiated by citizens has fallen (from 74.95% to 52.48%) while conversations initiated by professionals have almost doubled (from 25.05% to 47.52%) and the proportion of messages sent by professionals has incremented substantially. In this same regard, the percentage of conversations involving a response from the professional has decreased considerably (from 1.79% to 0.47%) and the

proportion of conversations with a response, of those initiated by the patient, has fallen slightly (from 90.8% to 80.61%) (Table 3).

Table 3: Activity by initiator

		Number of conversations initiated	Number of conversations with a response	Number of messages sent
Citizens	Pre COVID	189,145 (74.95%)	175,534 (92.80%)	195,219 (44.20%)
	During COVID	304,639 (52.48%)	245,582 (80.61%)	315,656 (36.54%)
Professional	Pre COVID	63,225 (25.05%)	1,134 (1.79%)	246,437 (55.80%)
	During COVID	275,857 (47.52%)	1,286 (0.47%)	548,211 (63.46%)

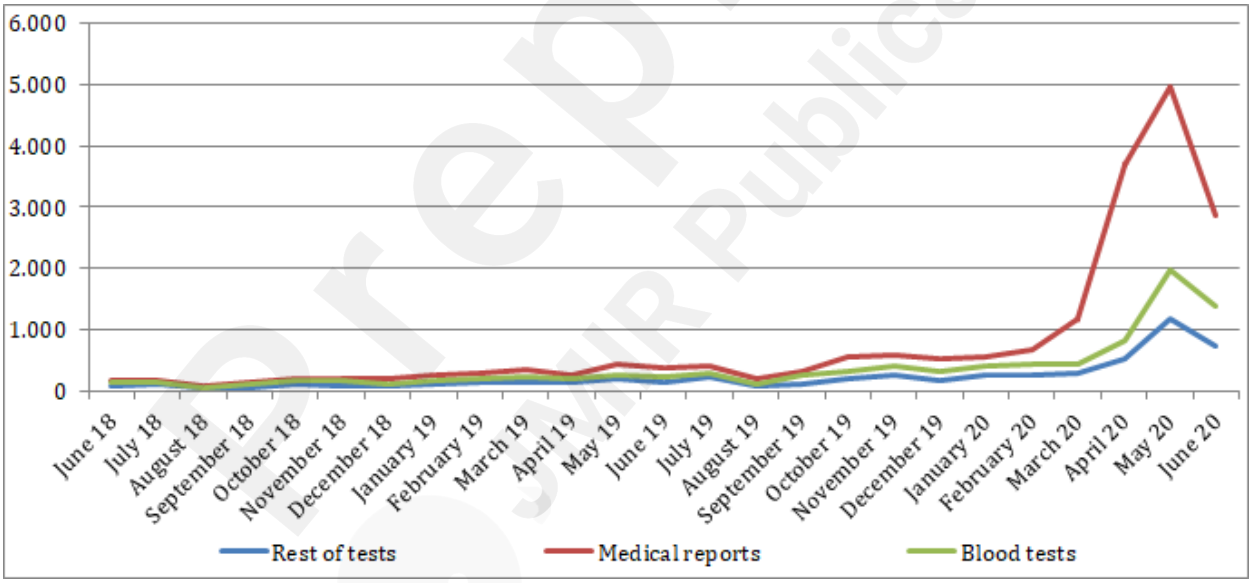
The number of documents attached to eConsulta messages sent by citizens before and during COVID was also analysed (Table 4 and Figure 2). There is a clear increment in the number of files sent, especially in terms of medical reports.

Table 4: Average number of monthly tests, by type (SD)

	Pre COVID	During COVID	p value
Medical reports	328.05 (168.02)	3179.50 (1590.69)	0.037
Blood tests	223.62 (107.12)	1151.75 (669.03)	0.068
Other tests	140.57 (64.92)	672.75 (37.01)	0.066

T-test independent data.

Figure 2: Evolution of the number documents attached, by type



Finally, the variations in overall, face-to-face and online care by age have been analysed. Table 5 shows that the use of telemedicine has mitigated somewhat the decline in face-to-face visits in young age groups.

Table 5: Number of face-to-face visits and teleconsultations, by age group.

Visits	Age	Between March and June 2019	Between March and June 2020	Variation
Overall	Under 16 years of age	28,824	34,722	20.5%
	Between 16 and 44 years of age	1,756,336	1,786,902	1.7%
	Between 45 and 64 years of age	2,106,944	2,065,822	-2.0%
	Between 65 and 74	1,053,413	70.6222	-33.0%

	years of age			
	Over 75 years of age	1,486,168	1,094,727	-26.3%
eConsulta visit	Under 16 years of age	16 (0.06%)	550 (1.58%)	3,337.5%
	Between 16 and 44 years of age	14,155 (0.81%)	173,647 (9.72%)	1,126.8%
	Between 45 and 64 years of age	18,072 (0.86%)	180,448 (8.73%)	898.5%
	Between 65 and 74 years of age	4,044 (0.38%)	16,702 (2.36%)	313.0%
	Over 75 years of age	4,863 (0.33%)	16,793 (1.53%)	245.3%
Face-to-face visit	Under 16 years of age	26,188 (90.85%)	11,501 (33.12%)	-56.1%
	Between 16 and 44 years of age	1,424,661 (81.12%)	427,756 (23.94%)	-70.0%
	Between 45 and 64 years of age	1,614,686 (76.64%)	471,869 (22.84%)	-70.8%
	Between 65 and 74 years of age	786,859 (74.7%)	200,202 (28.35%)	-74.6%
	Over 75 years of age	1,020,346 (68.66%)	316,402 (28.9%)	-69.0%

Source: SISAP

4. Discussion

The outbreak of COVID has led to a significant increment in the use of teleconsultation by both citizens and professionals. The number of eConsultations per thousand inhabitants has risen from 5.61, a figure that can be considered low compared to other studies [6], to 33.10 after the start of the COVID pandemic. This increment is explained, first, by the fact that before the outbreak of the pandemic patients needed to have the authorization of their healthcare professional contact to be able to carry out eConsultations. After the outbreak of COVID-19, this permission was extended to all citizens. This greater use is also explained by the increment in the remote provision of care processes that before the pandemic were performed in person, enabling these citizens to receive remote assistance (sick leave and return to work, remote updating of electronic prescription plans for chronic patients or reactive prescriptions for non-face-to-face visits in acute patients and guidelines for monitoring oral anticoagulants in patients in treatment, among others). The reduction in the average age and the 5-fold increment in “passive” users (who receive but do not send messages) suggest that eConsulta has been widely used for notifying results or sick leave by connecting to the Personal Health Folder.

The pandemic has modulated the way eConsulta is used and the user profile. There has been an increment in use by both health professionals, with a clear increase in their initiative in sending messages and documents to citizens and young patients without chronic diseases. This is a group of citizens who before the pandemic were infrequent users of the system and that as a result of the pandemic, and because of the acute pathology they suffer, often related to COVID, have had to use it in order to contact the health services or receive test results. These processes have made it possible to continue to offer key and prevalent Primary Care processes in a non-face-to-face and safe and stable way, avoiding visits to Health Centres and contributing decisively to reducing the risk of infection during periods of strict lockdown of the population. It should be noted that eConsulta has not been used for the purpose of Covid-19 related mass messaging by the health system and has only been used for the purpose of care continuity of patients.

The results show that it is necessary to understand the type of use that is being made of the tool in order to make improvements in its operation and continue working on a model that improves the management of demand for primary care (and, in return, its efficiency). To date, the approach based on free text analysis using machine learning tools seems a suitable option to study the

evolution over time of the use of the teleconsultation service [3]. This, however, would be a suboptimal solution: the planned evolution of the eConsulta tool for the coming months is precisely the structured stratification of the reasons for consultation, reported by the citizens themselves before generating it, which will initially allow these to be redirected to the professional profiles (doctor, nurse, administrator, dentist, social worker, etc.) that can respond in a more agile and appropriate way based on the need expressed by the citizen in the message. In this way, care is decentralized to the different professional profiles, allowing a more efficient response to the citizen based on the reason for their consultation.

The pandemic generated by Coronavirus SARS-CoV-2 has changed the model of health care and this is especially visible in primary care centres, where the mostly face-to-face model has been replaced by a mixed model in which telemedicine tools play a very significant role. Although it is clear that the pandemic has led to a reduction in the diagnosis of many diseases [21] and a reduction in the control of chronic diseases [22], it is necessary to assess the effects of these changes in care (forced by the circumstances) on the health of the supported population to continue to guarantee quality health care. We need to emerge from this crisis with a clearer vision of how to continue to deploy telemedicine to obtain its benefits by avoiding or minimizing its drawbacks [12] and minimizing inequalities regarding access for the most vulnerable groups [23].

The acceleration of digital transformation processes in health centres has ensured the continuity of care of many basic care processes for the population during lockdown [11]. This new model of care is changing the way we interact with the healthcare system and the patient profile used by each channel. The results of this study show that non-face-to-face communications from the Catalan primary health care system are being used predominantly, in favour of the low-risk and younger population and, therefore, preserving face-to-face and home visits for the most complex and older population. This adaptation and flexibility of the health system's response, based on the different needs and types of patients, is good news and demonstrates the resilience that telemedicine tools have provided to the health system during COVID-19.

This study presents some limitations, as it does not evaluate the relationship between unanswered eConsultations and the type of visit, either in person or by telephone for the same user. It could be that the objective of many citizens who have sent an eConsultation was actually to get a face-to-face or telephone visit in which case the eConsultation would not have replaced these other types of visits.

Conclusions

In a context of less face-to-face accessibility to the health system, this study has revealed a change in the profile of citizen using the telemedicine tool. Since the start of the COVID-19 pandemic this patient profile is similar to that of the average citizen: actively employed, with low complexity of pathology and who receives more messages proactively from the health professionals through eConsulta. The pandemic has helped to socialize the use of telemedicine, and as a result, it has helped to mitigate somewhat the decline in face-to-face visits in young age groups.

5. Bibliography

1. Fernández O, Domínguez CO, Alés XB. Acceso de los pacientes a su historia clínica electrónica: ventajas e inconvenientes para pacientes y profesionales. FMC - Formación Médica Continuada en Atención Primaria 2017 Oct;24(8):425-427. [CrossRef]
2. La Meva Salut (Personal Health Folder). URL: https://lamevasalut.gencat.cat/ [accessed 2020-01-21] - Departament de Salut. Model D'Atenció No Presencial en el Sistema Sanitari de Catalunya. Barcelona: Departament de Salut; 2014 Jan 01.
3. López Seguí, F.; Ander Egg Aguilar, R.; de Maeztu, G.; García-Altés, A.; García Cuyàs, F.; Walsh, S.; Sagarra Castro, M.; Vidal-Alaball, J. Teleconsultations between Patients and Healthcare Professionals in Primary Care in Catalonia: the Evaluation of Text Classification Algorithms Using Machine Learning. International Journal of Environmental Research and Public Health. 2020
4. López Seguí F, Walsh S, Solans O, Adroher Mas C, Ferraro G, García-Altés A, García Cuyàs F, Salvador Carulla L, Vidal-Alaball J. Teleconsultation Between Patients and Healthcare Professionals in the Catalan Primary Care Service: Descriptive Analysis through Message Annotation in a Retrospective Cross-Sectional Study. JMIR (2020)
5. Vidal-Alaball J, Lopez-Seguí F. Ha llegado para quedarse: beneficios e inconvenientes de la eConsulta. Atención Primaria Práctica. 2020;2(1-2):1-2. doi:10.1016/j.appr.2020.100043
6. López Seguí F, Vidal Alaball J, Sagarra Castro M, García Altés A, García Cuyàs F. General Practitioners' Perceptions of Whether Teleconsultations Reduce the Number of Face-to-face Visits in the Catalan Public Primary Care System: Retrospective Cross-Sectional Study. JMIR 2020
7. Edwards, H. B., et al. "Use of a primary care online consultation system, by whom, when and why: evaluation of a pilot observational study in 36 general practices in South West England. BMJ Open. 2017 Nov 22; 7 (11): e016901. doi: 10.1136/bmjopen-2017-016901."
8. Atherton, Helen, et al. "The potential of alternatives to face-to-face consultation in general practice, and the impact on different patient groups: a mixed-methods case study." Health Services and Delivery Research 6.20 (2018).
9. Vidal-Alaball,J; Acosta-Rojas, R; Pastor, N; Sanchez, U; Morrison, D; Narejos, S; Pérez Llano, J; Salvador, A; López Seguí, F. Telemedicine in the face of the COVID-19 pandemic. Atención Primaria 2020.
10. Lee I, Kovarik C, Tejasvi T, Pizarro M, Lipoff JB. Telehealth: Helping your patients and practice survive and thrive during the COVID-19 crisis with rapid quality implementation. J Am Acad Dermatol. 2020;82(5):1213–4.
11. Pérez Sust P, Solans O, Fajardo JC, Medina Peralta M, Rodenas P, Gabaldà J, Garcia Eroles L, Comella A, Velasco Muñoz C, Sallent Ribes J, Roma Monfa R, Piera-Jimenez J. Turning the Crisis Into an Opportunity: Digital Health Strategies Deployed During the COVID-19 Outbreak. JMIR Public Health Surveill. 2020 May 4;6(2):e19106. doi: 10.2196/19106. PMID: 32339998; PMCID: PMC7199803.
12. Bashshur, Rashid, et al. "Telemedicine and the COVID-19 Pandemic, Lessons for the Future." (2020): 571-573.
13. Keesara S, Jonas A, Schulman K. Covid-19 and health care's digital revolution. N Engl J Med. 2020 Jun 04;382(23):e82. doi: 10.1056/NEJMp2005835. [PubMed] [CrossRef] [Google Scholar]
14. Croissance record du recours à la téléconsultation en mars. French Health Insurance. 2020. [2020-07-03].
15. Edwards HB, Marques E, Hollingworth W, Horwood J, Farr M, Bernard E, et al. Use of a primary care online consultation system, by whom, when and why: Evaluation of a pilot observational study in 36 general practices in South West England. BMJ Open. 2017;7(11):1–9.
16. Solans Fernández O, Lopez Seguí F, Vidal-Alaball J, Bonet Simo JM, Hernandez Vian O, Roig Cabo P, Carrasco Hernandez M, Olmos Dominguez C, Alzaga Reig X, Díaz Rodríguez Y, Medina Peralta M, Hermosilla E, Martínez León N, Gimferrer N, Abizanda González M, García Cuyàs F, Pérez Sust P. Primary Care Doctor Characteristics That Determine the Use of Teleconsultations in the Catalan Public Health System: Retrospective Descriptive Cross-Sectional Study. JMIR Med Inform 2020;8(1):e16484
17. Newhouse, Nikki, et al. "Patient use of email for health care communication purposes across 14 European countries: an analysis of users according to demographic and health-related factors." Journal of medical internet research 17.3 (2015): e58.
18. Monterde D, Vela E, Clèries M. "Los grupos de morbilidad ajustados: nuevo agrupador de morbilidad poblacional de utilidad en el ámbito de la atención primaria". Aten Primaria 2016; 48:674-82.
19. Gómez-Batiste, Xavier; Martínez-Muñoz, Marisa; Blay, Carles; Espinosa, Josea; Contel, Joan C; Ledesma, Albert. Identifying needs and improving palliative care of chronically ill patients, Current Opinion in Supportive and Palliative Care: September 2012 - Volume 6 - Issue 3 - p 371-378
20. Garcia-Gil M, Elorza JM, Banque M, et al. Linking of primary care records to census data to study the association between socioeconomic status and cancer incidence in Southern Europe: a nation-wide ecological study. PLoS One. 2014;9(10):e109706.
21. Colivicchi, Furio, et al. "The impact of the coronavirus disease-2019 pandemic and Italian lockdown measures on clinical presentation and management of acute heart failure." Journal of Cardiac Failure 26.6 (2020): 464-465.
22. Coma, Ermengol, et al. "Primary care in the time of COVID-19: monitoring the effect of the pandemic and the lockdown measures on 34 quality of care indicators calculated for 288 primary care practices covering about 6

million people in Catalonia." BMC family practice 21.1 (2020): 1-9.
23. Mold F, Hendy J, Lai Y, de Lusignan S. Electronic Consultation in Primary Care Between Providers and Patients: Systematic Review. JMIR Med Inform 2019;7(4):e13042. URL:

Aknowledgements

Abbreviations

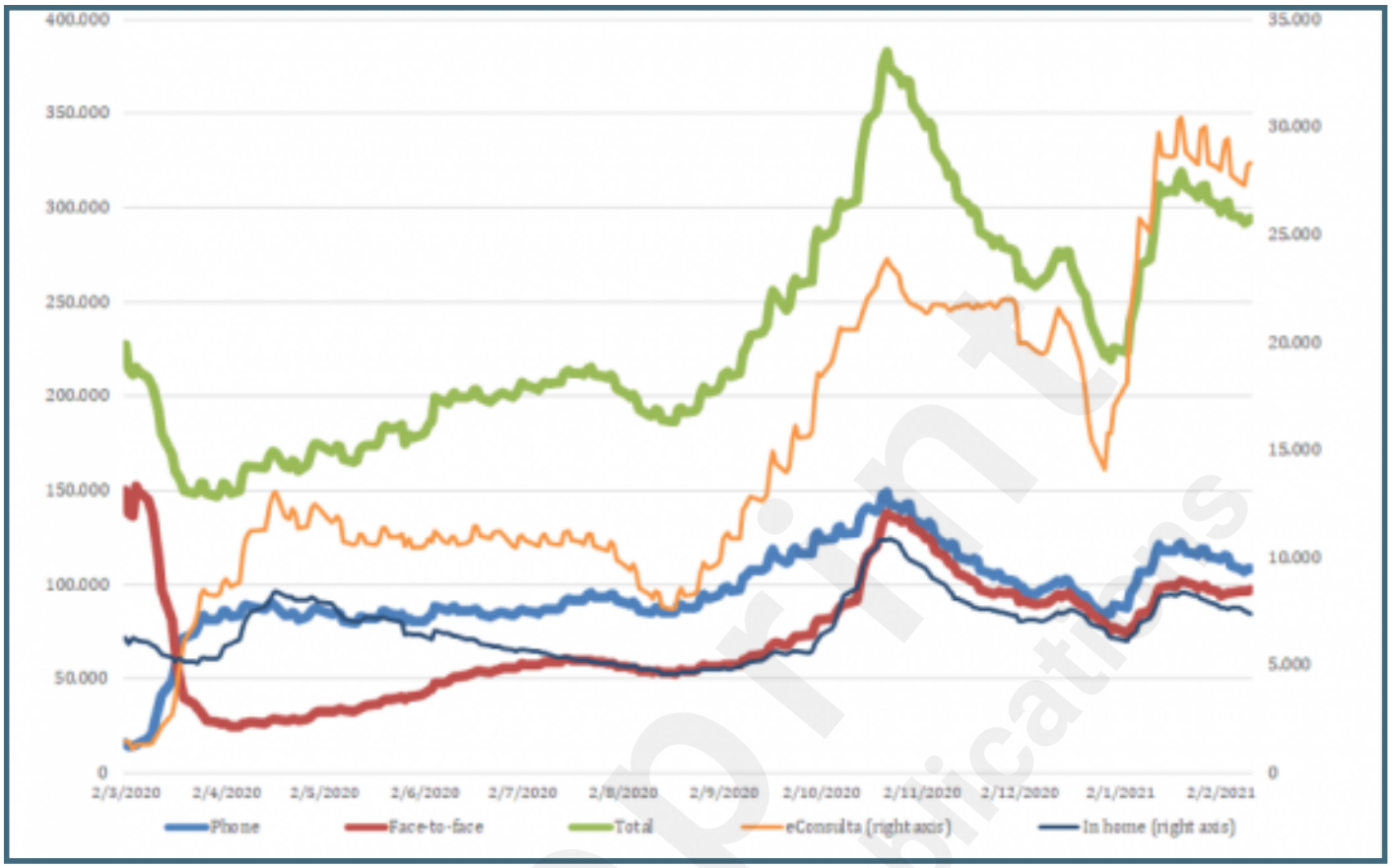
Conflicts of interest

None declared

Supplementary Files

Figures

Primary Care Daily Visits, per type. 7-days moving average. March 2020 - February 2021.



Attachments.