Medical Research Archives

ESMED
European Society of Medicine

OPEN ACCESS

Published: January 31, 2023

Citation: José Montero-Alía J, Casanova-Uclés, et al., 2023. The Covid-19 Pandemic Accelerates Changes in Delivery of Primary Health Care Started in 2019: Face-To-Face, Telehealth and Physician Workload after 12 Months, Medical Research Archives, [online] 11(1). https://doi.org/10.18103/mra.v11i1.3326

DOI
https://doi.org/10.18103/mra.v11i1.3326

ISSN: 2375-1924

RESEARCH ARTICLE

The Covid-19 Pandemic Accelerates Changes in Delivery of Primary Health Care Started in 2019: Face-To-Face, Telehealth and Physician Workload after 12 Months

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ABSTRACT

Objective: To assess the changes in Catalan General Practitioners practices a year after the outbreak of the pandemic by analysing the schedule and the types and complexity of consultations.

Methods: This is a multicentre descriptive study with General Practitioners from 27 primary care centres in the province of Barcelona, serving a population area of more than 400,000 inhabitants. The physicians volunteered to take part in the study. For the study, records of clinical activity were analysed prospectively and in real time, to compare the type of visit, reasons for consultation, adequacy and complexity of the consultation during a week of May 2019 versus a week of May 2021.

Results: During 2019 and 2021, a total of 88 General Practitioners participated in the study, collecting information of a total of 579 working days. We found statistically significant differences ($p<0.001$) in the number of face-to-face consultations (from 67.6% to 27.6%), phone consultations (from 8.31% to 35.4%) and remote consultation (from 0 to 11.3%), in 2019 and 2021, respectively. Clinical complexity, number of visits per day and number of reasons for consultation did not change significantly. The adequacy of the reasons for consultation decreased from 88.1% in 2019 to 83.8% in 2021 ($p<0.001$). Time to check medical tests, for reports and referrals increased significantly. The delay at 2 hours from the start of the

consultation did not vary, but toward the end of the shift there was a significant increase of more than 6 minutes. Whereas fatigue at the beginning of the shift was higher in 2021 than in 2019, fatigue at the end of the day did not vary.

Conclusions: In May 2021 doctors start the shift already tired, face-to-face visits decreased by more than half, phone consultations increased and the remote consultation was established in primary care services in Catalonia. The number of visits increased slightly, whereas the number of reasons for consultation and their adequacy did not substantially change. Clinical work without a patient and the delay at the end of the shift increased. A break of ten minutes per day was maintained. Further studies are needed to verify if this new pattern persists over time.

Keywords: primary care, physicians, workload, COVID-19

Background

From the 1980s, scientific societies, universities and government institutions aimed to quantify the workload, professional satisfaction and emotional state of General Practitioners (GPs), and to analyse the organizational structure and primary care services provided. The University of Manchester, the Royal College of General Practitioners and the Irish College of General Practitioners have been analysing these aspects periodically [1,2]. To this end, they use surveys that evaluate different health scenarios to implement measures conducive to better care for both the population and primary care professionals.

In 2010, the European Commission funded the QUALIPOPC study (Quality and Costs of Primary Care in Europe) with over 2 million euros [3]. The objective of this study conducted between 2011 and 2013 was to evaluate the quality, equity and costs of primary care services in 31 European countries plus Australia, Canada and New Zealand [4]. A total of 7,183 doctors and more than 60,000 patients answered a survey about their healthcare experience. In Spain, 428 family doctors participated. They worked 35.8 hours (±4.3 SD) per week, were allocated an average of 8.5 minutes per visit (±4.5 SD) and presented, together with Hungary, the worst job satisfaction of the 34 countries. One of the conclusions of the study was that the higher the job satisfaction, the better the care experiences patients reported. Also, patients valued positively when physicians worked longer hours and spent more time during consultations.

This 2011 study was compared with a study conducted in 1993 which included 31 European countries plus Israel [5,6]. During this 20-year gap, physician aging and feminization of the profession was observed, with increase in working hours and of face-to-face visits, especially in rural areas. No significant variation was observed in job satisfaction according to two questions that were repeated in both studies.

The progressive increase in working hours and the number of face-to-face visits is not new. The overload that results in lack of time in consultations is alarming, especially among women [7] and among doctors who care for a greater number of patients with complex psychosocial issues [8]. In the current situation, consultations are shorter and of lower quality, failing to address what really worries patients. Psychosocial factors are not usually addressed because they are time-consuming, leading to low patient satisfaction and a considerable increase in the use of emergency services [9]. At the professional level, the time pressure deteriorates job satisfaction and increases the GPs' desire for change [10]. A survey conducted in 2015 revealed than over 15,000 British doctors demanded more time per medical visit to improve the quality of care, and up to 93% reported that the workload was negatively affecting the quality of the service they provided [11].

Different factors influence the longer duration of the medical consultation, such as the gender (female) of the patient and the professional, the greater number of reasons for consultation, city setting, old age of the patient, and the General Practitioner (GP) focus on psychosocial issues. Conversely, as the workload increases, the time spent on each query decreases [8,12].

General Practitioners in the Spanish public health system work between 35 to 37.5 hours per week, either in morning or afternoon shifts.

The COVID-19 pandemic demanded a radical reorganization of health services during the months of lockdown. Phone consultations have been instrumental to patient follow-up during this period [13], and mobile applications to provide telehealth have also been useful [14]. Since 2015, primary care

services have implemented a tool called eConsultation (remote consultation/telehealth) for non face-to-face consultations. It is based on an online platform, similar to a chat that is stored in the patients' electronic records, where images and reports can also be attached. The use of eConsultation was very low until 2020, when its use trebled during the first months of the state of emergency to compensate for the decrease in face-to-face visits, especially among younger, more tech savvy patients [15]. Hospitals did not have a similar tool, and only had phone consultations to replace face-to-face visits [16]. Finally, videoConsultation, a virtual face-to-face consultation via webcam, was also widely implemented.

The study group of the Maresme Family Medicine Observatory (OMFaM) compiled the clinical activity of a proportion of GPs in Catalonia. The Observatory was created in 2016 with the support of the Catalan Society of Family and Community Medicine (CAMFiC) and the Official College of Physicians of Barcelona (COMB). Currently, the Observatory consists of 93 doctors from 30 primary care centres in Catalonia. They periodically monitor aspects of the primary care health services that are not regularly recorded, such as the reasons for a patient's consultation, the clinical complexity and adequacy of the consultation, the perception of fatigue, interruptions during consultations, and the breaks during shifts [17-20].

This study analysed the changes in the work of GPs in Catalonia accelerated by the outbreak of the SARSCov2 pandemic.

Methods

For epidemiological surveillance, a network of sentinel GPs was deployed in 2016 in a region north of Barcelona. Participation was voluntary, but each primary care centre (PCC) required at least two sentinel doctors. Their function was to provide data regarding everyday practice.

Centre Selection: participation of PCC and physicians was voluntary. Centre participation remains open and expanding (from 21 at the beginning of the initiative to the current 27).

Selection of Sentinel Physicians: Criteria to become a sentinel physician were to have a permanent position in a participating PCC, having a population assigned and a daily consultation schedule. Exclusion criteria were not having patients assigned and not performing clinical work. The selected participants received training, which included simulated patient cases to standardize data collection. Participation as sentinel physician is dynamic and open, and takes into consideration doctors' transfers, retirements and new participating physicians. The community of participating doctors has grown from 55 at the beginning to the current 88.

This is a multicentre descriptive study with 88 physicians selected using a convenience sample representative of 371 physicians from 27 primary care teams located in the province of Barcelona (see Table 1). The health centres are located in 30 urban centres with a catchment population over 400,000 people.

We considered the voluntary GPs participating in the study as sentinel physicians. They did not receive any financial incentive. The profile of the sentinel doctor is a 47-year-old woman (70% women physicians) who has been working in the primary care centre for an average of 11 years.

Table 1. Comparison between the total number of physicians in the area and participating sentinel physicians.

	Total physicians in the area	Sentinel physicians
Number	371	88
Age	47.6 years	47.9 years
Women	68%	70%
MIR*	71%	66%

*MIR: Residents of Family and Community medicine (4 years of training).

To reduce variability in the medical records, two sessions with simulated patients were organised. Subsequently, discrepancies were discussed within the group, the answers were agreed and transferred to the "investigator's manual". The manual was distributed among all participants, who could contact the research team at any time to resolve any questions or incidents.

Each sentinel doctor chose a full working week (from Monday to Friday) in May 2019 and May 2021 to collect the data. The data were written on a paper data collection notebook during the consultation, to

avoid memory bias. Each visit was analysed at the end of the consultation. At the end of the week, the notebooks were sent to the logistics centre of the research team. A copy was retained in the original PCC.

Our study compares the workload using clinical activity records (prospectively and real time, to avoid recall bias) during one week in May 2019 (before the pandemic) and one week in May 2021 (over a year since the outbreak of the pandemic).

To measure clinical activity, the variables detailed in Table 2 were used.

Table 2. Variables used for clinical activity records in 2019 and 2021.

WORK DAY
Number of work days.
Work shift: morning or afternoon.
COVID day. During the pandemic in 2021, the whole shift took place in an isolated area of the health centre for all types of suspected respiratory conditions, with maximum protection.
OBSERVATIONS OF EACH VISIT
Types of visit: **Face-to-face** (the patient goes to the care centre), **Phone Call** (we speak to the patient by phone), **Virtual** (not face-to-face or phone, in 2019 we included the few eConsultations we had), **Medical validation** (validation of the recommendations of nurse practitioners, prescriptions mostly) and **Home visits** (visits in the patient's home). In 2021, the visit system through **eConsultation (remote consultation)** and **Video Consultation** (previously included in virtual visits) was accounted for separately.
Number of reasons for consultation
Reasons for consultation: **Acute-Physical** (short-term condition or need for a quick solution), **Chronic condition follow-up** (check-up of chronic conditions such as diabetes and hypertension), **Psychosocial conditions** (visit with a high emotional component), **Administrative** (visit to obtain reports, take sick leave, get prescription for chronic medication, etc).
Adequacy of the visit: subjective assessment (yes/no) on whether the reason for consultation might have been solved by a health professional other than a doctor.
Complexity of the visit: subjective assessment of the time and dedication we need to address a seemingly complex problem. We subdivide it into **clinical complexity** (the clinical problem requires more analytical effort than usual, a detailed exam and time), **communication issues** (language barrier, companion interference), **psychosocial/emotional** (social or psycho-emotional condition that requires time and attention), **multiple queries** (many long requests), and if it was complex for any other reason, **other** (interruptions, programming errors, etc).
OBSERVATIONS ON THE WHOLE WORK DAY
Fatigue: Subjective value between 0 and 10, on the perception of tiredness at the beginning and end of the work day.
Visit Delay: The difference at 2 hours and 5 hours between the time scheduled on the computer and the real time at which the visit takes place was measured in minutes.
Unscheduled visit time: The time spent on a day checking medical tests, writing reports or checking referrals was counted in minutes.
Break time: The time we stopped working to go to the toilet, to get a drink or snack, or simply resting was counted in minutes.

Statistical Analysis

In this descriptive analysis, continuous variables were expressed as means and standard deviations because they followed a normal distribution, and categorical variables as frequencies and percentages. The chi-square test was used for bivariate comparisons of categorical variables, and the Student's t-test was used for continuous variables.

No imputation technique was used for missing data because it is our experience that weekday workloads can greatly vary.

R package version 4.0.3 (R development Core Team, General Public License) and Rstudio version 1.3.1093 (R Foundation for Statistical Computing, Vienna, Austria) were used to analyse the data.

Results

Between 2019 and 2021, a total of 88 doctors participated in the study. In 2019, clinical activity information was obtained for 242 working days, and for 337 days in 2021. The average number of shifts collected by each doctor was 4.7 in 2019 and 4.6 in 2021. In 2021, face-to-face visits decreased and phone consultations increased (Table 3).

Table 3. Distribution of work days and types of visit in 2019 and 2021.

	2019	2021	p-value
Distribution	1 week in May	1 week in May	
Total work days	242	337	
Work shift			0.106
Morning	147 (60.74%)	230 (68.25%)	
Afternoon	78 (32.23%)	92 (27.30%)	
COVID work shift		27 (8.01%)	
Type of clinical work			
Total visits	6572	10163	
Type of visit			< 0.001
Face-to-face	4443 (67.60%)	2808 (27.63%)	
Remote	1330 (20.24%)	2085 (20.52%)	
Phone call	546 (8.31%)	3603 (35.45%)	
House call	105 (1.60%)	129 (1.27%)	
Medical validation	142 (2.16%)	343 (3.37%)	
eConsultation	0	1154 (11.35%)	
Video consultation	0	11 (0.11%)	

The average number of visits per day increased significantly, but not the reasons for consultation. The average number of face-to-face visits decreased by 50% (p<0.001). The clinical complexity did not change in 2021 compared to 2019. The variation regarding the adequacy of the reasons for consultation is significant, with a decrease from 88.1% in 2019 to 83.8% in 2021 (Table 4). The reasons for consultation have increased in the phone consultations, and decreased in face-to-face consultations (Tables 4 and 5).

Table 4. Number of visits, reasons for consultation and adequacy per work shift.

	May 2019	May 2021	p
Average of visits per day	27.63 (SD4.99)	29.93 (SD7.39)	0.042
Average reasons for consultation per day	38.83 (SD8.76)	39.67 (SD10.00)	0.622
Average of face-to-face visits per day	18.59 (SD3.17)	9.20 (SD3.21)	< 0.001
REASONS FOR CONSULTATION			
Reasons			< 0.001
Administrative	1885 (20.39%)	3107 (23.02%)	
Acute physical	3409 (36.88%)	4670 (34.61%)	
Psychosocial	276 (2.99%)	481 (3.56%)	
Follow up of chronic condition	3651 (39.50%)	5033 (37.30%)	
Complexity	2410 (36.67%)	3840 (37.78%)	0.151
Adequate reasons for consultation	8145 (88.11%)	11315 (83.85%)	< 0.001

Table 5. Average reasons for consultation according to visit type, comparing 2019 versus 2021.

	May 2019	May 2021	p-value
Reasons for consultation in **all** visits	1.46 (0.70)	1.33 (0.61)	<0.001
Reasons for consultation in face-to-face visits	1.65 (0.88)	1.58 (0.75)	<0.001
Reasons for consultation in **non** face-to-face visit	1.08 (0.36)	1.09 (0.34)	0.254
Reasons for consultation in phone consultations	1.14 (0.45)	1.33 (0.59)	<0.001
Average reasons for consultation in home visits	1.56 (0.76)	1.62 (0.77)	0.537
Average reasons for consultation in medical validation visits	1.09 (0.36)	1.05 (0.25)	0.354
Average reasons for consultation during eConsultations		1.19 (0.46)	

Time to check medical tests, for reports and referrals increased significantly. The delay at 2 hours from the start of the shift did not vary. However, it significantly changed at the end of the shift, with an increase of more than 6 minutes. Fatigue at the beginning of the day was greater in 2021 than in 2019. Fatigue at the end of the day remained the same (Table 6).

Table 6. Time in minutes for clinical activities without patient, and consultation delay. The professional's fatigue during the work shift is measured on a scale of 1 to 10.

	May 2019	May 2021	p
Time to check blood tests	5.35 min (8.07)	9.20 min (11.20)	< 0.001
Time for medical reports	6.95 min (11.02)	9.13 min (12.13)	0.025
Time to check referral results	0.58 min (2.23)	1.45 min (5.17)	0.007
TOTAL time WITHOUT patient	12.88 min (16.27)	19.77 min (23.60)	<0.001
Delay after 2 hours	19.97 min (18.20)	18.35 min (18.48)	0.366
Delay after 5 hours	21.54 min (24.09)	27.83 min (28.98)	0.027
Break time	12.54 min (10.13)	12.05 min (11.02)	0.600
Fatigue at the beginning	2.34 (2.14)	3.01 (2.21)	0.001
Fatigue at the end	5.78 (2.24)	5.92 (2.23)	0.448

Discussion:

Our study describes the shift in clinical practice after the Covid-19 pandemic outbreak: face-to-face visits decreased from 67.6% to 27.6%, phone consultations, at 35.4%, became the most common form of clinical consultation, GPs started the consultation already fatigued, they finished the shifts with longer delays, and the eConsultation (or remote consultation) was consolidated.

Few studies approach the clinical work of a GP, even less in relation to the pandemic. To the best of our knowledge, no study compares the same parameters one year before and after the pandemic.

The number of visits per day in 2021 increased compared to 2019, while the number of reasons for consultation remained the same. In contrast, number of reasons increase significantly for phone consultations.

Two aspects remain practically unchanged in these two years. Firstly, the perception of complexity by the GP (37%). Secondly, the type of consultation content, which is determined by the GP and did not change significantly despite very different working conditions.

A similar study conducted in 2019 in Ireland [21] describes the workload of 123 Irish doctors who registered the time they dedicated to medical consultations, phone consultations, paperwork, research, etc. The average time dedicated to two sessions (each session would correspond to half a day) was 9.9 hours (5 hours per session). A subgroup of 26 physicians detailed their clinical activity during 3,906 consultations in 316 sessions. The number of consultations per session was 12.4, which corresponds to an average of 25 face-to-face visits per day. The average duration of the consultation was 14 minutes and 53 seconds. This study was undertaken prior to the pandemic, and GPs spent approximately 3 hours of face-to-face visits per each 5-hour session.

If we compare this study with our 2019 data, we should explain the working day of a GP in the Catalan public health system. Physicians work shifts of 7 hours in teams of primary care professionals, sharing consultations. They start at 8 a.m. in the morning and end at 8 p.m. at night. A shift overlap between 2:00 p.m. and 3:00 p.m. allows some time for all GPs of a primary care centre to meet. The consultation times were agreed in 2018 by the Catalan government and the unions as follows: 12 minutes for a face-to-face visit, 6 for a phone visit, 6 for telehealth, and 45 minutes for a domiciliary visit. In 2019, each doctor visited an average of 18 people, 10 in non face-to-face visits, they dedicated 23.5 minutes to medical tasks without a patient, and had a 12-minute break, with a delay of 21 minutes in the schedule. Unlike in the Irish study, we did not record consultation times, but from the data we can infer that 12 minutes per shift are systematically exceeded.

A study conducted in Germany compares primary care clinical activity prior to the pandemic and during the weeks of lockdown (from April 21 to July 14, 2020) [22]. It describes how the weekly shifts of 110 GPs working for the mandatory sickness

insurance were reduced from 45.6 to 35.9 hours and that the number of weekly visits decreased, from 199 to 101. The comparison is difficult, since the German care model (Bismark) is very different from the Spanish (Beveridge), which might explain the differences observed: in contrast with doctors who worked in teams, 54.6% of GPs working alone did not reduce their activity. The reasons for consultation were categorised into 29 conditions. There was a marked reduction in many of these consultations (between 30% and 50%). In contrast, our analysis takes place one year after the start of the pandemic and when the state of emergency had finished. Nonetheless, we believe that our study reflects more structural, lasting changes.

We believe that the time frame of our study explains the limited variation in the type of consultation content with respect to the pre-pandemic era. A similar analysis conducted just after the outbreak of the pandemic would have revealed a predominance of acute conditions and administrative requests, and very reduced follow up of chronic conditions, as found in the German study.

Regarding specific conditions, during the first quarter of 2020 we observed a reduction in the follow up of chronic diseases, in screenings and vaccinations in all primary care teams [23].

In the last decade, online consultation systems or eConsultation have been developed without much patient participation [24]. Since 2015, pilot studies have been carried out in England with electronic consultation systems in response to increased demand and to reduce face-to-face and phone visits. The study concluded that it increased the workload since the technology was not well integrated with the clinical history, and instead of freeing up clinicians' time, eConsultation was used by many patients to skip the conventional appointment circuit. However, patients were happy to be able to contact the system at any time and to raise perceived uncomfortable issues [25,26].

Our study confirms the pandemic as the driving force of telehealth (eConsultation), representing up to 11.3% of the total visits made in 2021 by sentinel doctors. Telehealth has transformed the work of primary care teams in Catalonia since in 2015 the Catalan government introduced it to all primary care teams. The first studies were very encouraging regarding the decrease in the demand for face-to-face consultation [16,27,28]. However, patients need to be informed about its proper use to avoid misunderstandings or becoming an inconsequential chat that translate into more work and heightened professional anxiety.

However, we should strongly emphasise the results regarding phone consultations, exceeding 35% of the visits, a four-fold increase compared to 2019 (8.3%). Similar results have been found in Antwerp, where 9 family doctors compare clinical activity in 2019 vs the first 5 weekends of the pandemic in 2020. Face-to-face visits were reduced by 45% and phone consultations increased by 40% [29].

Eventually, such a high number of phone consultations becomes unsustainable both for patients and professionals. Even before the pandemic, studies revealed that although phone consultations presented some advantages such as easier accessibility, it could generate stress and insecurity. Knowing the patient and the experience of the doctor were crucial factors for successful phone consultations [30,31].

The time scheduled for phone consultations, determined as 6 minutes per patient before the pandemic, was the same in 2019 and 2021. In the post-pandemic era, with thousands of postponed visits and a clear increase in anxiety, 6 minutes are insufficient to address the patient's problems adequately. Moreover, we do not have data on how many of these phone consultations solve the problem and how many will additionally require a face-to-face visit.

A significant increase in delay at the end of the shift (from an average of 21 minutes in 2019 to 27 minutes in 2021) that reflects work overload was observed. Notably, despite the marked reduction in face-to-face visits, it is still impossible for most doctors to avoid delays. Various factors might influence this finding, such as the increase in number of consultations, the difficulty of managing phone consultations, and the doctors' fatigue when starting their shifts. Additionally, the fatigue increases when a phone call includes several reasons for consultation.

Lastly, the adequacy of visits decreased in 2021 compared to 2019. Adequacy is a subjective criterion established by the GP, who evaluates if the reason for consultation could have been resolved by another professional. Our study shows that 14% of consultations did not require a family doctor. Although not specifically studied, this might respond to restricted accessibility to health centres, long waiting lists for medical tests, and the almost impossibility to access hospitals.

The major limitation of the study is that physician participation was voluntary and resulted from a group of doctors calling their colleagues. This situation could cause a certain Hawthorne effect, i.e., participants altering their behaviour when feeling observed. However, we believe that it mostly contributes to a greater accuracy of the data obtained. Working with a random sample of physicians is almost impossible without funding, since recording in real time what happens after each visit involves time and effort.

Another important limitation regarding comparison with other studies is the professional competence of the sentinel doctors and their team organization, which might influence the perception of complexity and suitability.

Pandemic situations demand an acceptable combination of face-to-face visits with the exponential need for telehealth and phone consultations for GPs to be able to finish their working shifts and come back the next day. This necessarily implies synchronous and asynchronous time management if we pursue an adequate resolution of health problems. Importantly, this does not just affect professionals, but also the population, which needs to properly use the different access channels of the health system.

Conclusions

The study underscores the dramatic change in doctor-patient interaction before and after the pandemic. Notably, one year after the COVID-19 pandemic outbreak and the end of the state of emergency in Spain in May 2021, GPs in Catalonia started their shifts more fatigued than in 2019, only half of the consultations were face-to-face, and phone and eConsultations increased. The number of total visits per day increased, while the number of reasons for consultation remained similar except for the increase during phone consultations. The reasons for consultation seemed less adequate in 2021 than in 2019, the time needed for clinical work without a patient increased, the ten-minute break was maintained and the delay at the end of the consultation day increased. Further studies should confirm if this pattern continues in 2022 and beyond.

Conflicts of Interest Statement:

The authors declare that they have no conflict of interest.

Funding Statement:

Grant "Gonçal Calvo i Queraltó 2016" from the Maresme section of the Acadèmia de Ciències Mèdiques i de la Salut de Catalunya i Balears.

Grants for Primary Care Research from the Direcció d'Atenció Primària Metropolitana Nord. 2017.

Grants for Primary Care Research from Catalan Society of Family & Community Medicine (CAMFiC). 2018.

Acknowledgments

Research members of the Observatory of Family Medicine in Maresme (OMFaM) 2021: Montserrat Català (EAP Mataró 1), Mª José Merino (EAP Mataró 1), Angèlica Alba (EAP Mataró 1), Joan Martí (EAP Mataró 1), Eugènia Barbena (EAP Mataró 1), MªMercè Jiménez (EAP Mataró 1), María Bartolomé (EAP Mataró 2), Esther Fabré (EAP Mataró 2), Rosa Mª Catellanos (EAP Mataró 2), Adoración Saiz (EAP Mataró 2), Mª Carmen Barreiro (EAP Mataró 3), Juan José Montero (EAP Mataró 3), Imma Monreal (EAP Mataró 3), Regina Romeu (EAP Mataró 3), Raquel Tienda (EAP St Adrià Besòs), Gregorio Hinojosa (EAP Mataró 4), Isaac Buxadé (EAP Mataró 4), Núria Mengual (EAP Mataró 5), Antonia Armada (EAP Mataró 5), Teresa Gros (EAP Mataró 5), Anna Champer (EAP Mataró 5), Jordi Creus (EAP Mataró 6), Dolors Sánchez (EAP Mataró 6), Elena Zurilla (EAP Mataró 6), Gemma Casas (EAP Mataró 6), Paola Gutièrrez (EAP Mataró 6), Mª Mar Gómez (EAP Mataró 6), Josep Massons (EAP Mataró 7), Magda Bundó (EAP Mataró 7), Joan Domènech (EAP Mataró 7), Tamara Jiménez (EAP Mataró 7), Sílvia Cid (EAP Mataró 7), Eva Leceaga (EAP Mataró 7). Josefa Plaza (EAP Mataró 7), Felipe Saatdjian (EAP Mataró 7), Eva Miguel (EAP Arenys), Maite Cid (EAP Arenys), Sara Sancho (EAP Arenys), Teresa Llodrà (EAP Arenys), Maite Sastre (EAP Berga), Laia Guix (EAP Berga), Neus Sanz (EAP Berga), Maria Alegre (EAP Argentona), Mario Navajas (EAP Argentona), Laura Sánchez (EAP Argentona), Mercedes Megías (EAP Premià), Mònica Domínguez (EAP Premià), Assumpció Villar (EAP Premià), Carme Forcada (EAP Premià), Estíbaliz López (EAP Llavaneres), MªJosep Font (EAP Llavaneres), Rosa Francisco (EAP Llavaneres), Isabel Moreno (EAP Vilassar de Mar), Jana Gerhard (EAP Vilassar de Mar), Luis Villanueva (EAP Vilassar Mar), Carme Viñas (EAP Vilassar de Mar), Jesús Pagès (Vilassar de Mar), Rosa Ma Sierra (EAP Ocata-Teià), Esther Valentín (EAP Ocata-Teià), Antonia Ocaña (EAP Ocata-Teià), Eva Nebot (EAP Ocata-Teià), Antonio Escobar (EAP Ocata-Teià), Sara Franquesa (EAP

Ocata-Teià), Pascual Roig (EAP El Masnou), Mª Dolores Àlvarez (EAP El Masnou), Idaira Damas (EAP Llefià), Ariadna Cardelus (EAP Calella), Susana Curós (EAP Calella), Laura Rodríguez (EAP Calella), Carme Pascual (EAP Calella), Gemma Estrada (EAP Malgrat), Manuel Fernando Noguera (EAP Pineda de Mar), Marta Piró (EAP Montgat-Tiana), Esther Hernández (EAP Montgat-Tiana), Elsa Lemaignan (EAP Montgat-Tiana), Ana Mª Giraudo (EAP Blanes), Silvina Arlcorta (EAP Blanes), Leonardo Heredia (EAP Blanes), Laia Terris (EAP Blanes), Mª del Mar Rodríguez (EAP Canet), Eva Calvo (EAP Canet), Martin Cebollada (EAP Canet), Lourdes Martin (EAP Vall de Tenes), MªVictoria Zamora (EAP Gòtic), Antoni Dalfó (EAP Gòtic), Begoña Núñez (EAP Gòtic), Marta Mourelo (EAP Gòtic), Mencia Benítez (EAP Gòtic), Carolina Guiriguet (EAP Gòtic), Xènia Arias (EAP Parets del Vallès), Josefina Sánchez (EAP Parets del Vallès), Neus Sanz (EAP St Quirze de Besora), Joan Herreros (EAP Granollers 4), Antonio Casanova (CUAP Maresme) y Marta Ruiz (Suport Administratiu).

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