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**LES DIMENSIONS DEL RESULTAT ASSISTENCIAL  
DE L'ATENCIÓ PRIMÀRIA DE SALUT**

**Tesi doctoral dirigida per  
Dr. Joan Gené i Badia  
Departament de Salut Pública. Universitat de Barcelona**

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# Personalised care, access, quality and team coordination are the main dimensions of family medicine output

Joan Gené-Badia<sup>a,b,c</sup>, Carlos Ascaso<sup>d</sup>, Georgia Escaramis-Babiano<sup>d</sup>, Laura Sampietro-Colom<sup>e</sup>, Arantxa Catalán-Ramos<sup>a</sup>, Mireia Sans-Corrales<sup>a,f</sup> and Enriqueta Pujol-Ribera<sup>a</sup>

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**Background.** Health organisations continually seek good output indicators of family medicine health care provision because they are accountable to society, they need to compare services, and need to evaluate the impact of organisational reforms.

**Objectives.** Using the sources of information routinely available in health-service management, we sought to assess the groups of components of primary health care output that best serve to define the outcome of family medicine services.

**Design.** Cross-sectional descriptive study.

**Site.** Primary health care in Catalunya.

**Participants.** Two hundred and thirteen primary health care teams.

**Measurements.** Information was collected on team structure, user satisfaction, quality-of-professional-life of the health care professionals, and physicians' drug prescription. Confirmatory Factor Analysis was used to assess the number of dimensions that best explained the family medicine outcome.

**Results.** The model that best fits the structure of the data (AGFI = 0.778) is that which consists of three dimensions i.e. (1) the individual accessibility to the services and professional-patient relationship; (2) the coordination within the health care team; (3) the scientific-technical quality of the service. The first two of these dimensions were correlated between themselves, but the third was totally independent of the other two.

**Conclusions.** Using sources of information that are routinely employed in primary health care services management, the model enables the measurement of the output of family medicine by considering the dimensions such as inter-personnel relationships, internal coordination of the team and the scientific-technical quality of the service. Despite its simplicity, this measure of the output incorporates the views not only of the users but also of the health care professionals.

## Introduction

Health care systems need performance indicators of family medicine services for public accountability,

for comparison between centres and countries<sup>1</sup> and for evaluating the impact of health care reforms. To be generally applicable for comparing different service-provider organisations, these indicators need

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<sup>a</sup>Institut Català de la Salut (ICS), Spain, <sup>b</sup>Consorci d'Atenció Primària de Salut de l'Eixample (CAPSE), Spain, <sup>c</sup>Departament de Salut Pública Universitat de Barcelona, Spain, <sup>d</sup>Departament de Salut Pública, Unitat de Bioestadística, Universitat de Barcelona, Spain, <sup>e</sup>Unitat de Plans Estratègics, Departament de Salut, Generalitat de Catalunya, Barcelona, Spain and <sup>f</sup>Departament de Medicina, Campus de Bellvitge, Universitat de Barcelona, Spain. Correspondence to Joan Gené-Badia, Consorci d'Atenció Primària de Salut de l'Eixample (CAPSE), C/Roselló 161, Barcelona 08036, Spain; Email: jgene@clinic.ub.es

to be simple and based on the data derived from information systems that are routinely available within health care organisations.<sup>2</sup>

The Institute of Medicine in the USA recommended that family medicine practitioners should publish their performance indicators relating to costs, quality, accessibility and satisfaction of the patient as well as that of the health care professional.<sup>3</sup> Further advice was to search for other indicators that would better illustrate the impact of the service on the citizen, and which would evaluate aspects related to the main components defining primary health care.<sup>4</sup> A recent systematic review of the literature highlighted that such attributes of family medicine (accessibility, continuity, consultation duration, patient–physician relationship, coordination between services and implementation of preventive measures) were related to improvements in health, or in the satisfaction of the patient.<sup>5</sup>

Focus-group studies which collected the opinions of health care professionals, managers and users of family medicine services, identified four dimensions of the health care product. Combining their fundamental attributes these were: (1) access to the services; (2) coordination within the primary health care teams (PHCT), and with other levels of health care facilities; (3) relationship between the health care professionals and the users of the service; (4) scientific-technical quality of the PHCT and the range of services provided. Equity, satisfaction and efficiency were identified as the main cross-sectional axes of the components of output.<sup>6</sup>

Inevitably, there are different groupings of the same dimensions because many of them are intimately related.<sup>7,8</sup> Hence, with the objective of attempting to unify the dimensions used in evaluating these services, we planned this study to describe the groupings that best define the output of family medicine services while using the sources of information that are routinely available in health care management.

## Materials and methods

A cross-sectional study was designed to analyse the output of family medicine services from 267 PHCT which, in the year 2003, were integrated within the *Institut Català de la Salut* (ICS; the Catalan Health Service). This organization covers primary health care requirements for ~77% of the population of the Autonomous Region of Catalonia (Spain). The other 23% of the population are covered by other health care providers.

### *Data sources*

The variables studied were obtained from the following databases used routinely in the administration of the ICS in the year 2003. These included the structural

database of the health care teams, a questionnaire of user satisfaction, a questionnaire assessing quality-of-professional-life, and the database of drug prescription.

*Team structure.* The database of team structure contains characteristics of the team such as geographical location, professional composition, extent of the catchment population, and quantitative indicators of clinical activity.

*User satisfaction.* The primary health care service user's questionnaire was designed to measure user satisfaction. These aspects included: team organization; performance of the physicians, nurses and clerical staff; care received; extent to which the health problem was resolved; and the physical premises of the Primary Care Centre (PCC). The questionnaire was voluntary and self-reporting. Each question of each section was measured on a scale of 0 (very dissatisfied) to 10 (very satisfied). Each PCC received 200 questionnaires biannually. The selection for the study sample was by quotas such that, of the 200 questionnaires, 50 were for paediatrics, 100 for the population aged between 15 and 64 years (50% for females and 50% for males), and the 50 remaining questionnaires distributed to the population >64 years of age (25 for females and 25 for males). Failures to respond were covered by substitution.

The questionnaire was validated in a sample of 1780 individuals, mean age 46.4 years (SD 15.5), 64.2% were women, who were attending 9 urban PCC over a period of 1 week in the year 2000.<sup>9</sup> The reliability of the questionnaire was validated using Cronbach's alpha coefficient which demonstrated an optimal consistency of the five factors: the team's organization = 0.87; the performance of the physicians, nurses and clerical staff = 0.92; the care received = 0.96; the extent to which the health problem was resolved = 0.96; the physical premises of the PCC = 0.74 (i.e. good or excellent in all situations).

*Quality of professional-life.* The quality professional-life questionnaire (QPL) contained 35 items and, from which, a profile composed of three summed scores can be defined for overall QPL<sup>10</sup>: work demands, support from the hierarchy, and intrinsic motivation. Each item of the questionnaire was measured on a scale of 1 (very dissatisfied) to 10 (very satisfied). The questionnaire was distributed every year to every the PCHT during the month of November. The response rate to the QPL questionnaires in 2003 was 66.68%.<sup>11</sup>

The questionnaire was validated in a sample of professionals (health care and non-health-care workers) who were employed in March 1995 in 8 of the 9 Primary Care Directorates (PCD) of the Subdivision of the Costa de Ponent-Tarragona-Tortosa (SAP) of the ICS. Of the 4506 professionals, 2926 responded (64.8%).

The reliability of the questionnaire was validated by Chronbach's alpha coefficient showing good consistency for the three defined factors: work demands = 0.81; support from the hierarchy = 0.86; intrinsic motivation = 0.75. Finally, the stability of the questionnaire was evaluated using the test-retest system administered in the Old Town Health Area of Barcelona (*Area Bàsica de Salut Gòtic de Barcelona*) with an interval of 15 days between the two administrations.

*Prescription.* The data on prescription were obtained from the invoices sent by the pharmacy offices of the participating centres. This database contained not only the cost per citizen but also the type of drug prescribed to each patient. With this information it is possible to generate a synthetic indicator of the quality of the prescriptions, termed Prescription Quality Standard. It is a pool of indicators that increases the score with respect to the following aspects: (1) the prescription of a high proportion of drugs with a demonstrably high efficacy and safety; (2) to limit the use of new drugs that do not add therapeutic value to the drugs already available for the same clinical indications; (3) to reduce the over-prescription of some groups of drugs (antibiotics, benzodiazepines, NSAIDs and proton pump inhibitors; and finally, (4) adherence to a selection of drugs recommended by evidence-based guidelines for the treatment of common primary health care problems (antihypertensive, hypolipaeimants, anti-diabetics, antibiotics, anti-asthmatics, anti-depressives, hypnotics, proton pump inhibitors and NSAID). Annually, a numerical objective is agreed for each performance indicator. This goal is calculated based on the 75th percentile of the previous year's performance for the overall group of physicians. The objectives may be achieved in various grades scored from 0 to 130 (<http://www.eurodurg.com/country%20presentations.pdf>).

### *Dimensions*

Among the variables that were collected from these information sources were those that could be, potentially, a measure of each one of the four dimensions proposed in the qualitative study<sup>6</sup> and, further, whose values would reflect the activity and capacity of the PHCT (Table 1). Accessibility and physician-patient relationship were measured with those variables evaluated by the service users with respect to the function and organisation of the PHCT, in addition to the indicators of appropriateness of the numbers of PHCT professionals employed for the catchment population. Team coordination was measured from the perspective of the health care professionals working within the PHCT. The continuity of health care provision by the family physician and specialist was that perceived by the patient. The relationship between the health care professional and the patient was measured from variables that quantified the work-load of the physicians

together with the patients' opinions on the manner in which they were treated, the perceived quality of the service, and the physician's empathy. The scientific-technical quality was evaluated using the prescription indicators taking into account the cost and the quality of drug appropriateness for the clinical indication. Also included was the overall consumption, the consumption of drugs for mental health disorders, chronic conditions and for prevention, since these aspects were identified as being essential by, both, health care professionals and by the patients.<sup>6</sup>

### *Statistical analyses*

The dimensions of the output of primary care were evaluated using the methodology of Confirmatory Factor Analysis.<sup>12,13</sup> The principal objective of the technique is to quantify the degree to which the correlations between several observed variables can be explained by a few latent variables which, in our study, were termed dimensions. In this sense, the procedure attempts to reduce data dimensionality.

The model parameters were estimated via maximum likelihood, which has the advantage of being scale free. Thus, parameter estimations are all comparable independently of the scale used to measure the variables. The correlations between the model dimensions as well as the correlations between the measurement errors of the variables that define each dimension were assessed based on the modification index values<sup>12</sup>; incorporating those with a modification index >2. To determine regression coefficients not significantly different from zero and, furthermore, to eliminate them from the model, confidence intervals based on bootstrap methodology<sup>14</sup> were used.

Three models were fitted. The first model consisted of four dimensions (described in Table 1). The second model had three dimensions and is the result of collapsing the dimension of accessibility and the dimension of the health care professional-patient relationship from the previous model. The new dimension indicates that easy accessibility to the PCC and to its PHCT favours the continuity of care and is conducive to good relationships between health care professionals and patients. Finally, the third model consisted of two dimensions and is the result of the dimension of accessibility to the PCC and to its PHCT being combined with the coordination dimension within the PHCT. The output remains separated into two aspects; one which refers to the technical quality of the health care and the other which groups all the aspects referring to the human factor and the organization of the services (inter-personnel relationships and team work).

The process of electing the most appropriate model was based on the differences in the  $\chi^2$  values ( $\Delta\chi^2$ ) between consecutive models, and in the adjusted goodness-of-fit index (AGFI)<sup>12</sup> varying between 0 and 1 (where 1 defines the perfect fit). The models

TABLE 1 Selected variables and information source for each dimension of the output

Dimension	Dimension sub-divisions	Selected variables	ICS data source
Accessibility	Accessibility to services	Satisfaction with service organisation	US
		Satisfaction with clinical visit duration	US
		Satisfaction with the general information provided	US
	Cultural access	Satisfaction with telephone consultation	US
		Workload; population assigned/number of team members	PHCT
		Satisfaction with physician's information	US
Coordination within-team and other levels	Coordination within the team	Satisfaction with nurse's information	US
		Satisfaction with clerical personnel's information	US
		Evaluation of support from superiors	QPL
	Coordination: family physician and specialists	Evaluation of support from colleagues	QPL
		Evaluation of feedback on personal performance	QPL
		Evaluation of the team member's proposals being listened-to and taken into consideration by the team	QPL
Relationship between user and health care professional	Addressing the social and psychological problems	Patient satisfaction with the family physician/specialist coordination	US
		Time dedicated to the user; Adult visits/number of team members	PHCT
		Satisfaction with physician's courtesy	US
	Empathy	Satisfaction with nurse's courtesy	US
		Satisfaction with clerical personnel's courtesy	US
		Satisfaction with the resolution of users' problems	US
Scientific-technical quality	Prescription	Satisfaction with the attention to user's needs	US
		Satisfaction with the respect accorded to user's privacy	US
	Mental health	Quality of prescriptions standard	MC
		Cost of prescriptions standardised by patient age	MC
	Prevention and management of chronic pathologies	Anti-depressants prescribed: % of the recommended	MC
		Tranquilisers prescribed: % of the recommended	MC
		Anti-hypertensive medications prescribed: % of the recommended	MC
		Anti-diabetes medications prescribed: % of the recommended	MC
		Anti-asthma medications prescribed: % of the recommended	MC

US: user satisfaction questionnaire; PHCT: Primary care team structure; QPL: Quality of professional life questionnaire; MC: medication consumption; ICS: Institut Català de la Salect.

were fitted using the Amos 4 module of the SPSS software package.

## Results

The analysis included a total of 213 PHCT out of the 267 that were within the administration remit of the ICS in the year 2003. Fifty-four PHCT were excluded from the study because of incomplete data sets. Table 2 summarises the PHCT data on those that did and did not, participate in the present study. There were no significant differences between these two groups of PHCT.

The model that best fitted the structure of the data was that which consisted of three dimensions (Table 3) with an AGFI of 0.778. Figure 1 contains the main parameter estimates of the model. The 'relationship between patient and health care professional', 'accessibility' and 'coordination of the team' dimensions correlated positively. Conversely, the 'scientific-technical quality' dimension was independent of the others. Parameters that related the variables studied with each dimension had values between 0 and 1 if the relationship was positive and between 0 and -1 if negative (Figure 1). The variables related to the 'relationship between health care professional and patient

TABLE 2 Description of the 267 primary care teams (PHCT) that are managed by the Institut Català de la Salut (ICS) in the year 2003 segregated as a function of participation, or not, in the study

		PHCT included (n = 213)	PHCT not included (n = 54)	Statistic	P
Rural	N (%)	90 (85.71)	15 (14.29)	$\chi^2 = 3.783$	0.052
Urban		123 (75.93)	39 (24.07)		
% Population >60 year	Mean (SD)	17.07 (4.57)	18.45 (5.83)	$T = 1.622$	0.109
Socio-economic level					
S1 (very high)	N (%)	28 (82.35%)	6 (17.65%)	$\chi^2 = 1.743$	0.627
S2		80 (83.33%)	16 (16.67%)		
S3		71 (76.34%)	22 (23.66%)		
S4 (very low)		34 (77.27%)	10 (22.73%)		
% Immigrants	Mean (SD)	8.99 (4.75)	10.44 (6.67)	$T = 1.835$	0.068
Year of clinical governance programme commencement	Mean (SD)	1993.60 (4.82)	1993.04 (4.23)	$T = -0.786$	0.433

TABLE 3 Measure of adjustment and test of hypotheses related to the selection of confirmatory factorial model that best fits the structure of the data

	$\chi^2$	g.l	$\Delta\chi^2$	$\Delta$ g.l	P	AGFI
Model; 4 dimensions	479.927	178				0.776
Model; 3 dimensions	480.099	180	0.172	2	0.918	0.778
Model; 2 dimensions	667.408	181	187.309	1	<0.001	0.701

$\chi^2$ : Chi-squared statistic that measures the discrepancy between the structure of the data estimated by the model, and that of the observed.

$\Delta\chi^2$ : Difference between the  $\chi^2$  statistics of the model compared to the increase in the parameters required to significantly improve the goodness-of-fit of the model.

AGFI: adjusted goodness-of-fit index which ranges between 0 and 1; where 1 = perfect fit, and which penalises any increase in the parameters of the model.

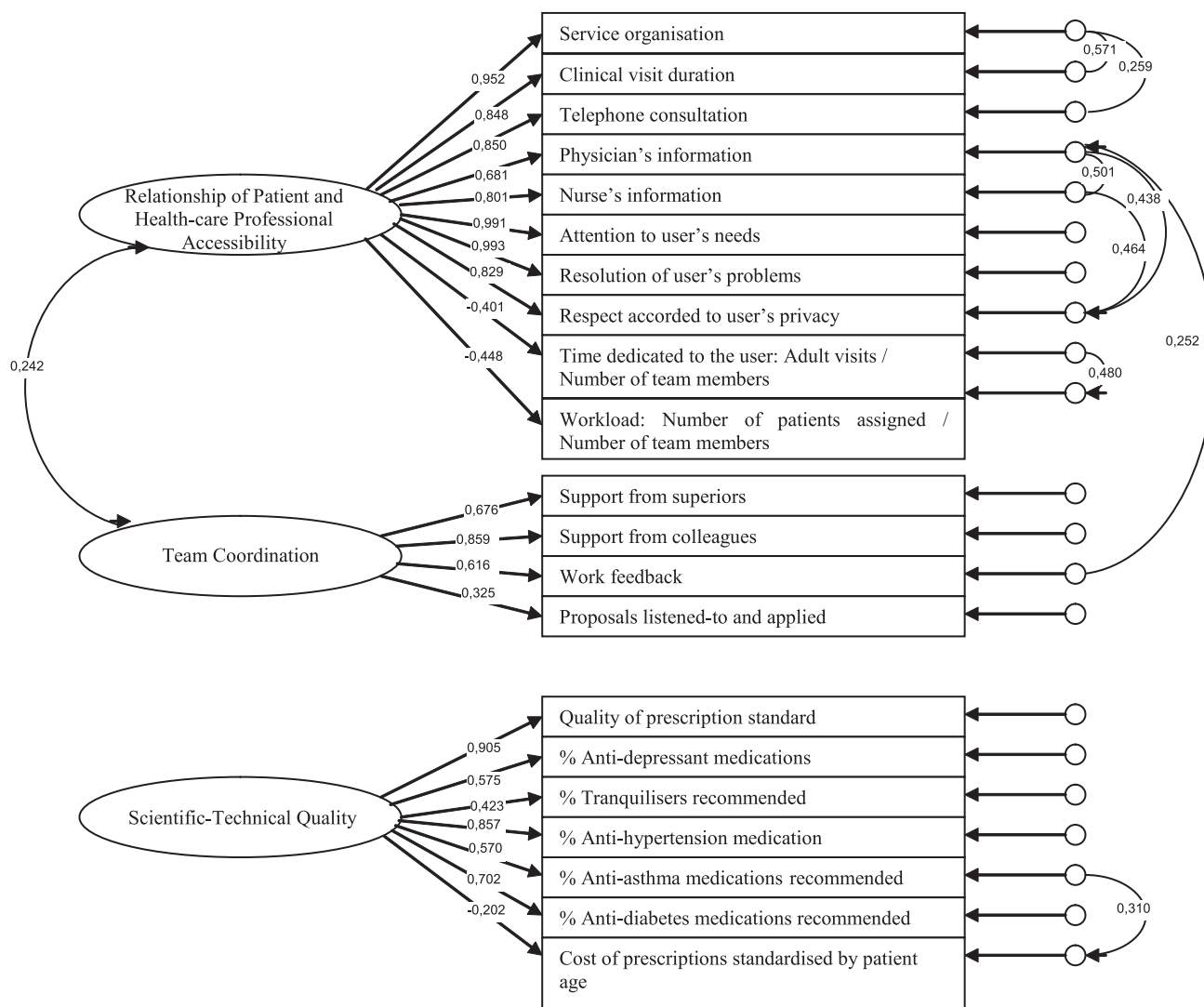
and accessibility' dimension were: organisation of the services, appropriate consultation time, satisfaction with the telephone consultation, quality of explanations provided by the nurse, attention to the user's needs, resolution of the user's problems and concern for the privacy of the user. With respect to the 'coordination of the team' dimension, the significant variable was that of colleague support. Finally, the variables related to the 'scientific-technical quality' dimension were: overall indicator of drug quality standard and the percentage of anti-hypertensive drugs prescribed.

## Discussion

Our results show that many of the attributes that describe family medicine output are tightly inter-related. We identified a three dimensions model that explains, with high efficiency, the variability of the data (AGFI = 0.778). The three dimensions are those of: inter-personnel relationships, the team organisation, and scientific-technical quality. The first dimension is tightly linked to all those aspects describing personal relationships between the health care professionals and the patient, and also included aspects of accessibility of the patient to the services.

The second refers to the capacity for team-work based on the coordination between different health care professionals. The third dimension, which is totally independent of the previous two, is based on scientific-technical quality, or the extent to which the health care procedures are based on the best evidence available.

Other authors have observed a relationship between accessibility and continuity with respect to the physician-patient relationship. Responses by health care users in Massachusetts (USA) to a questionnaire were evaluated in relation to the impact on outcomes of the different components of the health care provision (accessibility, continuity, overall care, integration, clinical interaction, inter-personal relationship, confidence). The results indicated that the only factors that were associated with 'best outcomes' were the patient's confidence in the physician and the physician's knowledge of the patient.<sup>7</sup> Also of note was that the dimension of individualised clinical care was independent of the dimension of team coordination. An evaluation of the care provided by family physicians in Holland found that only two dimensions contributed independently to the final output of the care: one was related to the structure (management and organisation of the team) and the other was related to the process of clinical care.<sup>8</sup>



**FIGURE 1** Standardised regression parameters and correlations between dimensions of the Confirmatory Factor model selected to identify the output of family medicine services within the ambit of the Institut Català de la Salut (ICS). The boxes represent the indicators selected from the routine database of the ICS. The ellipses represent the dimensions that comprise the output of the services. The unidirectional arrows represent the relationships between the dimensions and the indicators and the bidirectional arrows represent the correlations between dimensions

Despite interactions between aspects related to team organisation, physician–patient relationship, and scientific-technical quality,<sup>15–17</sup> our model shows that teams that rely on good technical quality do not necessarily have good outputs in terms of inter-personal relationships with patients, or with respect to team coordination. Conversely, it is not unreasonable to expect that there would be an association between the dimension of patient–physician relationship and that of team coordination in primary care; teams having a good work-place environment having more satisfied users, as well.<sup>18</sup>

We need to highlight that the indicators introduced in the analysis were those variables that best fit the parameters identified in the qualitative study. We do not know if this same grouping would be maintained

if other variables had been used.<sup>6</sup> It would be of considerable interest to assess whether our model continues to be valid if applied to other health care organisations. The method would achieve full validation if the PHCT classified as ‘good’ or ‘bad’ performers under the criteria of the present model receive the same classification if other procedures of quality of health care evaluation of health services management were used.

It may appear surprising that the variables relating to scientific-technical aspects were derived only from information available on drug prescription. We used this source of data because most health care organisations make use of detailed prescription information because of the importance of this section within a health-service budget. Prescription data are more

valid than that derived from audits of clinical records which, usually, are of small sample size. However, the increasing computerisation of clinical records in family medicine will enable more rapid analyses of whole populations and, as well, provide valid and valuable information on the technical quality of clinical procedures for inclusion in this dimension of family medicine output evaluation.

Family medicine services need to be able to measure their health care output using their own registries and should not have to rely on information from other levels of health care. As such, we chose not to include indicators that are becoming increasingly popular, such as the concept of avoidable hospitalisation,<sup>19</sup> since these data are obtained from registrations of patients' discharge from hospital which, often, are not readily available to PHCT.

Our current model provides an overview of family medicine output which incorporates not only hard indicators and objectives such as drug prescription, but also other more subjective indicators linked to the opinions of the users and the healthcare professionals. This perspective offers a better view of the expectations of health-and-service provision in primary care when the patient seeks help from the family physician.<sup>6,20</sup> The evaluation of the family physician's performance exclusively based on objective indicators<sup>21</sup> does not display the whole range of activities fulfilled in general practice.

We developed a model that allows measurement of the output of the service provided by the family physician by considering the dimensions of personal relationships, internal coordination of the PHCT, and the technical-scientific quality of the health care provision. We used the sources of information that are easily available because they are routinely employed in the management of primary health care services. Despite its simplicity of data collection, the aspects identified as being linked to the expectations from the service have components that relate not only to the healthcare professionals but also to the users. This family medicine output may be useful in identifying PHCT with problems in fulfilling their health care remit since these would be highlighted as outputs deviating from that of the majority. It also allows evaluation of the impact of reforms introduced to help improve team performance, and to monitor the team's progress in achieving previously defined targets.

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