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Impact of a Program to Improve Appropriate Prescribing of Medications in Residential Facilities for Older Persons. Results After One Year

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Objective. To evaluate the impact after one year of a program to improve appropriate prescribing of medications, medical care products and supplies at a group of residential centers for older persons.
Design. Multicenter, controlled, quasi-experimental, before-after study of all outpatient prescriptions charged from each center to the Catalonian Health Service during the study period (reference year 2001, monitoring year 2002).
Setting. A total of 107 residential centers in the Barcelonés Norte y Maresme (Barcelona) health region.
Participants. After situation analysis the centers were divided into two groups: intervention (n=21) and control (n=86). A total of 4789 older persons were residents at participating centers during the study.
Interventions. The actions carried out in the intervention group were: a) letter describing the program; b) face-to-face interview to provide information; c) distribution of printed information about the study´s aims and the indicators recorded, and d) monitoring with several follow-up interviews.
Main measures. We recorded quantitative indicators (general, specific and urinary incontinence products), qualitative indicators (use of medications with high intrinsic pharmacological value and generic pharmaceutical specialties) and relative drug use. The data were analyzed with a program written for Microsoft Access.
Results. In the intervention group we found that pharmaceutical costs were contained, a result we attributed to the greater efficiency achieved with the intervention (interannual increase of 0.7% in the reference period to 16.2% in the monitoring period; P=.000). The contribution of urinary incontinence supplies to cost reductions was noteworthy. Total costs in terms of numbers of packages dispensed for all therapeutic subgroups decreased by 4.8% (P=.000). The use of generic pharmaceutical specialties increased by from 7.9% to 13.1%, and the results for qualitative indictors for antiasthmatics and recommended NSAIDs also revealed improvements in prescribing quality.
Conclusions. The preliminary results of the program show it to be effective in improving the efficiency of drug prescribing at participating nursing homes. The research method was useful in promoting the rational use of medications and improving the quality of prescribing practices.

Key words: Nursing homes. Quality indicators. Drug use. Intervention strategies.

IMPACTO DE UN PROGRAMA DE ADECUACIÓN DE LA PRESCRIPCIÓN DE MEDICAMENTOS EN CENTROS RESIDENCIALES GERIÁTRICOS. RESULTADOS AL AÑO DE SU IMPLANTACIÓN

Objetivo. Evaluar el impacto de un programa de adecuación de la prescripción de medicamentos y efectos y accesorios en un conjunto de centros residenciales geriátricos al año de su implantación.
Diseño. Estudio casi experimental multicéntrico, antes-después con grupo control, que incluye todas las prescripciones ambulatorias realizadas a cargo del Servicio Catalán de la Salud, individualizadas por centros durante el período de estudio (referencia: año 2001, y monitorización: año 2002).
Emplazamiento. Un total de 107 residencias de la Región Sanitaria del Barcelonés Norte y Maresme (Barcelona).
Participantes. A partir de un análisis de situación se dividen los centros en 2 grupos: intervención (n = 21) y control (n = 86). Número de residentes: 4.798.
Intervenciones. Las acciones realizadas en el grupo de intervención fueron: *a)* carta de presentación; *b)* entrevista informativa cara a cara; *c)* emisión de un cuadro de mando bimensual, y *d)* monitorización con varias entrevistas de seguimiento.
Mediciones principales. Se evaluaron mediante el establecimiento de indicadores cuantitativos (generales, específicos y en incontinencia urinaria), cualitativos (valor intrínseco farmacológico elevado y especialidades farmacéuticas genéricas) y de uso relativo. El análisis de los datos se realizó a partir de una aplicación desarrollada en Microsoft Access.
Resultados. En el grupo de intervención se evidencia una contención del gasto atribuible a una mayor eficiencia en las actuaciones (incremento interanual entre los períodos de referencia y monitorización del 0,7 y el 16,2%, respectivamente; p = 0,000), con una destacada contribución de los absorbentes para la incontinencia urinaria. El importe total entre los envases consumidos para todos los grupos terapéuticos muestra una disminución porcentual del −4,8% (p = 0,000). Además, se incrementa la utilización de especialidades farmacéuticas genéricas del 7,9 al 13,1%, y los resultados cualitativos en antiasmáticos y antiinflamatorios no esteroideos recomendados presentan un perfil de mejora en la calidad de la prescripción.
Conclusiones. Los resultados preliminares del programa se muestran efectivos para mejorar la eficiencia en la prescripción farmacéutica de las residencias seleccionadas. El método se ha mostrado apropiado para promover el uso racional del medicamento y mejorar la calidad del perfil de prescripción.

Palabras clave: Residencias geriátricas. Indicadores de calidad. Utilización de medicamentos. Estrategias de intervención.

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A commentary follow this article (pág. 181)

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Introduction

Aging of the population in developed countries has been attributed to decreased birth rates and increased life expectancies, among other causes.[1-2] These demographic changes are manifested in cultural, economic, social and health phenomena, and lead to an increase in the use of health resources. Psychosocial impairment, a health status of functional dependence, and multiple chronic medical conditions are some of the factors characteristic of this group of older persons, some of whom are institutionalized in nursing homes.[3-5]

In view of the expansion of the therapeutic arsenal devoted to caring for older persons, and in light of the fact that the number of persons residing in a nursing home is now double the number living at home, these factors lead to a greater risk for adverse effects, drug interactions and medication errors.[6-9]

Some publications report profiles of overuse of specific drugs or therapeutic subgroups, and others center on specific drugs for chronic diseases or their inappropriate use.[10-12]

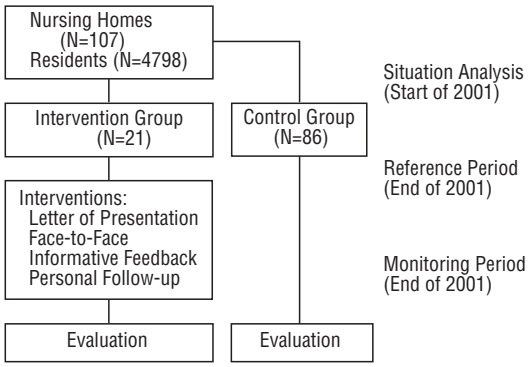
Against this background we examined the need to reduce the inappropriate use of drugs, to optimize the efficiency of pharmaceutical care, and to foment strategies intended to facilitate the rational use drugs and improve the quality of prescribing practices based on safety and efficacy criteria. Evidence available from pharmacological evaluations in nursing homes has rarely been analyzed, and few reports of research done in Spanish nursing homes have been published.[13-14]

The present study was designed to measure the efficacy, after one year, of a program to improve appropriate prescribing practices for drugs and medical care supplies in a group of residential nursing homes.

Material and Methods

We analyzed pharmaceutical prescriptions at 107 residential nursing homes in the Barcelonés Norte y Maresme health region during the period from January 2001 to December 2002. The total population served by these two regions of the public health care system is 708 118 inhabitants, 14.7% of whom are older than 65 years according to the latest census.[15] The unit of study was the nursing home, regardless of whether it was a public or private center, and regardless of whether the services it provided were also offered by other centers. An initial situation analysis was done to characterize the preintervention reference scenario. Each center was assigned to the intervention or control group according to strategic criteria based on opportunity costs with reference to medical prescriptions for drugs and medical supplies written between January and December 2001. The prioritization factors were: *a)* total cost of drugs at each center and interannual increase; *b)* whether the organism that managed the center monitored costs, or *c)* whether unfavorable results for qualitative or efficiency indicators were obtained. During the monitoring period we recorded prescriptions dispensed from January to December 2002.

Material and methods



General Scheme of the Study

Multicenter, controlled, quasi-experimental, before-after study to evaluate the impact after one year of an intervention strategy to modify prescribing for medications and medical supplies at nursing homes.

We used a multicenter, controlled, quasi-experimental, before-after design to study of all outpatient prescriptions written by each prescribing physician that were charged to the Catalonian Health Service (CHS). We excluded from the study prescriptions for which the prescribing physician was not identified or which were not recorded by the pharmaceutical tracking system, and nursing homes that opened or were incorporated into the public health system during the study period.

The actions carried out in the intervention group were as follows: *a)* a letter describing the program and its aims, and requesting permission to include the center in the study; enclosed was a questionnaire requesting general information about the center and about the number and type of residents it served; *b)* a face-to-face meeting, lasting about 2 hours, with the medical directors and managers of each center, and with the director of the primary care center whose staff were responsible for writing prescriptions for the patients served by the nursing home; during the meeting detailed information was provided on the results of the situation analysis and the monitoring process; *c)* bimonthly distribution of printed material that contained general and specific information about the quantitative and qualitative indicators to be used during the study; to obtain informative feedback, a list was also provided of the prescribing targets for each therapeutic subgroups of drugs, and *d)* monitoring with 2 to 4 follow-up interviews during the second year (2002). All interviews at each center were led by one of the authors, and the purpose of the interviews was to highlight the positive results obtained or offer specific recommendations, reached by consensus with the medical staff, to correct shortcomings. The first interview was held at each center during the first trimester of the year. None of the nursing homes selected declined to participate in the program.

Overall figures for costs (retail price in euros) were obtained for each nursing home and each main therapeutic subgroup. The system of quantitative indicators proposed consisted of total cost of all packages prescribed, total cost per nursing home resident, proportion of total costs per center represented by the cost of uri-

TABLE 1 General Characteristics of the Patients and Quantitative Indicators in the Intervention and Control Groups*

Indicator	Period	Intervention, %	Control, %	Total
No. centers	Total	21 19.6%	86 80.4%	107
Residents	Mean	2013±78 42.0%	2.785±97 58.0%	4798±85
No. packages	Reference	232 446 44.5%	290 359 55.5%	522 805
	Monitoring	227 696 41.1%	326 603 58.9%	554 299
	% Increase	–2.0%	12.5%	6.0%
Total costs	Reference	3 378 415.75 44.0%	4 307 145.68 56.0%	7 685 561.43
	Monitoring	3 403 629.29 40.5%	5 002 812.74 59.5%	8 406 442.03
	% Increase	0.7%	16.2%	9.4%
Cost UIP	Reference	1 185 743.56 42.7%	1 593 758.39 57.3%	2 779 501.95
	Monitoring	1 132 262.15 39.6%	1 728 511.21 60.4%	2 860 773.36
	% increase	–4.5%	8.5%	2.9%
Cost per package	Reference	14.53±8.32	14.83±9.76	14.70±9.32
	Monitoring	14.95±9.54	15.32±8.92	15.17±8.99
Cost per resident	Reference	1678 30±254.87	1546.55±367.67	1601.83±321.33
	Monitoring	1690.82±356.76	1796.34±421.33	1752.07±311.23
% UIP/total cost	Reference	35.1%	37.0%	36.2%
	Monitoring	33.0%	34.6%	4.4%
% Nighttime UIP	Reference	60.4%	69.0%	65.3%
	Monitoring	53.9%	59.4%	59.4%

Cost is expressed as a percentage of volume of sales in euros.
% Increase is percentage interannual increase from 2001 to 2002.
*UIP indicates urinary incontinence products (pads, diapers, etc.); % Nighttime UIP, use of nighttime UIP expressed as a percentage of the total number of packages of UIP.

nary or fecal incontinence products (UIP), and percentage of total cost of IUP represented by nighttime pads or diapers. In addition, prescriptions for the following therapeutic subgroups were tracked:[16] drugs for peptic ulcer and GORD (A02), antihypertensives (C07, C03, C02), antidepressants (N06A), antiasthmatics (R03), antibacterials (J01, J03), and nonsteriod anti-inflammatory drugs (NSAID) and analgesics (M01, M02). As general qualitative indicators we used the percentage of packages with high intrinsic pharmacological value (HIPV), defined as drugs or associations whose clinical efficacy has been demonstrated in clinical trials or whose use is justified because of their immediate effect; and the percentage of generic pharmaceutical specialties (GPS). The qualitative indicators choice of drug or relative drug use were chosen by consensus among the authors on the basis of published information,[17] which provided an approximate estimate of foreseeable consumption. These indicators were recorded for each center as the number of packages of each active pharmaceutical principle in different therapeutic subgroups: *a)* percentage of first-line antiasthmatics (short-acting inhalers [short-acting beta adrenergic receptor antagonists: orciprenaline, terbutaline, salbutamol, procaterol, and reproterol], inhaled corticosteroids [fluticasone, budesonide, and beclomethasone], and ipatropium bromide) compared to second-line antiasthmatics (long-acting inhaled beta adrenergic receptor antagonists [salmeterol, formoterol], cromoglycate, and nedocromil), and drugs used only exceptionally (oral and parenteral presentations, leukotriene antagonists, and others); *b)* percentage of total NSAID use represented by sodium diclofenac, ibuprofen, and naproxen; *c)* percentage of systemic antibiotics (J01) represented by penicillins (J01C-J01K) and macrolides (J01F), and *d)* percentage of total systemic NSAID (M01) represented by rofecoxib and celecoxib.

For the statistical analysis the source of information consisted of text records provided by the prescription tracking system. The data matrix was built and the analyses were done with a specially-written program for Microsoft Access. Descriptive, univariate analysis was used for individual indicators, and nonparametric bivariate analysis with nonparametric tests of significance and Student´s *t* test for paired data were used for multiple comparisons. Statistical significance was set at $P<.05$.

Results

The costs generated by medical prescriptions charged to the CHS for residents of public and private nursing homes represented 10% of the total cost of prescription drugs in the Barcelonés Norte y Maresme health region. The number of packages prescribed during the study period at the 107 participating centers was 522 805 in 2001 and 554 299 in 2002, and these prescriptions generated costs of 7.7 million euros in 2001, and 8.4 million euros in 2002, for an interannual increase of 6.0% and 9.4%.

Table 1 summarizes the characteristics of participating centers during the study period, i.e., number of residents, number of packages dispensed, total cost generated for all medications, and UIP only in the intervention and control groups, and results for other general quantitative indicators. The centers in the intervention group represented 19.6% of all centers. The interannual increase (from the reference period to the monitoring period) in the number of packages dispensed was—2.0%, and the increase in total cost of all medications was 0.7%.

These results show that total costs were contained in the intervention group as compared to the control group. In this connection we note that use of UIP was not the same

TABLE 2 **Results for Quantitative Indicators by Principal Therapeutic Subgroup in the Intervention and Control Groups***

		Reference, Year 2001				Monitoring, Year 2002				Dif. % 2002-2001		
Therapeutic Subfroup	**Study**	**RPE**	**%RPE**	**%PTP**	**RPE/PTP**	**RPE**	**%RPE**	**%PTP**	**RPE/PTPV**	**RPE**	**PTP**	**RPE/PTP**
Anti-ulcers (A02B)	Intervention	237 402.52	7.0	4.2	24.11	193 156.74	5.7	4.2	20.40	–18.6	–3.8	–15.4
	Control	265 024.46	6.2	4.7	19.30	277 291.45	5.5	5.0	16.88	4.6	19.6	–12.5
	Total	502 426.98	6.5	4.5	21.31	470 448.19	5.6	4.7	18.17	–6.4	9.8	–14.7
Antidepressants (N06A)	Intervention	165 216.12	4.9	2.8	25.59	181 754.44	5.3	2.9	27.24	10.0	3.4	6.4
	Control	233 879.08	5.4	3.1	26.10	300 938.77	6.0	3.3	27.74	28.7	21.0	6.3
	Total ns	399 095.20	5.2	2.9	25.89	482 693.21	5.7	3.2	27.55	20.9	13.6	6.4
Antihypertensives (C02-C03-C07)	Intervention	153 075.67	4.5	7.1	9.26	156 171.92	4.6	7.2	9.52	2.0	–0.8	2.8
	Control	179 379.12	4.2	7.2	8.60	229 870.79	4.6	7.7	9.16	28.1	20.3	6.5
	Total	332 454.79	4.3	7.2	8.89	386 042.71	4.6	7.5	9.30	16.1	11.0	4.6
Antiasthmatics (R03)	Intervention	108 872.26	3.2	3.1	15.22	100 843.71	3.0	3.3	13.36	–7.4	5.5	–12.2
	Control	101 721.65	2.4	2.6	13.44	128 835.25	2.6	2.6	14.97	26.7	13.7	11.3
	Total[a]	210 593.91	2.7	2.8	14.31	229 678.96	2.7	2.9	14.22	9.1	9.7	–0.6
Antibacterials (J01)	Intervention	88 297.94	2.6	3.5	10.95	73 448.45	2.2	3.1	10.44	–16.8	–12.8	–4.6
	Control	106 584.39	2.5	3.8	9.74	96 202.35	1.9	3.2	9.32	–9.7	–5.7	–4.3
	Total	194 882.33	2.5	3.6	10.25	169 650.80	2.0	3.1	9.77	–12.9	–8.7	–4.7
NSAID (M01-M02)	Intervention	66 954.97	2.0	3.5	8.13	43 799.56	1.3	3.0	6.33	–34.6	–16.0	–22.1
	Control	78 589.66	1.8	3.3	8.15	81 912.08	1.6	3.5	7.12	4.2	19.2	–12.6
	Total	145 544.63	1.9	3.4	8.14	125 711.64	1.5	3.3	6.83	–13.6	3.0	–16.2
Total	Intervention	819 819.48	24.3	24.2	14.57	749 174.82	22.0	23.7	13.86	–8.6	–4.0	–4.8
	Control	965 178.36	22.4	24.7	13.46	1 115 050.69	22.3	25.4	13.47	15.5	15.5	0.1
	Total	1 784 997.84	23.2	24.5	13.95	1 864 225.51	22.2	24.7	13.62	4.4	6.9	–2.3

*RPE indicates retail price in euros; %PTP, percentage of the total number of packages for each therapeutic subgroup; %RPE, percentage of the total cost for each therapeutic subgroup; RPE/PTP, retail price in euros divided by total number of packages; Dif. % 2002-2001, percentage interannual increase for the years studied; NSAID, nonsteroidal antiinflammatory drugs; ns indicates not significant.
[a]statistical significance $P<.05$.

in both groups, with an increase from the reference period to the monitoring period of –4.5% in the former and 8.5% in the latter (P=.000). This item accounted for 35.1% of the total cost of medications and medical supplies in all nursing homes during the reference period, and for 33.0% during the monitoring period.

Table 2 shows the results for quantitative variables for the main therapeutic subgroups. These groups accounted for 23.2% of the total pharmaceutical cost, and for 24.5% of all packages dispensed during the reference period; the corresponding figures for the monitoring period were 22.5% and 24.7%. During the preintervention phase the subgroup that accounted for the greatest proportion of total costs (6.5%) was drugs for peptic ulcer (A02B). In the intervention group, the cost reduction (-8.6%) and lower number of packages dispensed (–4.0%) in comparison to the control group were findings of note.

The changes in total costs and number of packages dispensed for different therapeutic subgroups differed between the intervention and control groups. Especially significant was the difference in drugs prescribed to treat peptic ulcer (intervention group: total cost -18.6%, number of packages –3.8%) and NSAID (intervention: total cost –34.6%, number of packages –16.0%). The differences for antibacterials, antiasthmatics, and antihypertensives were smaller although also noteworthy. Total cost for all packages dispensed for all therapeutic subgroups decreased by 4.8% in the intervention group, and remained unchanged in the control group (0.1%) during the study. These differences were appreciable for antiasthmatics and NSAID, and contributed to the improvements in efficiency.

The findings for qualitative indicators, i.e., choice of drug and relative drug use, differed notably (Table 3). The percentage of prescriptions for HIPV drugs and GPS was above the standard/target values of 86% and 10%, respectively, in both the intervention and control groups. In the former, the use of GPS increased from 7.9% to 13.1% during the study. The results for choice of first-line antiasthmatics, recommended NSAID and use of coxibs showed slightly more improvement in the quality of prescribing practices in the intervention group as compared to the control group.

Discussion

Few studies have been published thus far in Spain on the use of medications at residential nursing homes.[13-14,18] Moreover, the different methods used to measure prescribing practices, and the frequent changes in consumption patterns in response to supply and the introduction

TABLE 3 **Results for Qualitative Indicators and the Choice of Drug and Relative Drug Use in the Intervention and Control Groups**

Qualitative Indicators and Relative Use	Target, %	Period	Intervention, %	Control, %	Total, %
HIPV	86	Preintervention	85.3	87.7	86.6
		Monitoring	86.6	88.6	87.8
		% increase	1.5	1.0	
GPS (packages)	10	Preintervention	7.9	8.4	8.2
		Monitoring	13.1	12.7	12.9
		% increase	65.8	51.2	
First-line inhalers/other Antiasthmatics	>1	Preintervention	1.0	1.0	1.0
		Monitoring	1.1	1.0	1.1
		% increase	11.0	2.0	
% diclofenac-ibuprofen-naproxen/NSAID	50	Preintervention	43.9	42.1	42.9
		Monitoring	56.8	49.0	51.7
		% increase	29.4	16.4	
% penicillins-macrolides/antibiotics	60	Preintervention	59.5	56.0	57.5
		Monitoring	57.9	57.6	57.7
		% increase	–2.7	2.9	
% coxibs/NSAID	8	Preintervention	12.3	11.9	12.1
		Monitoring	4.3	5.5	5.1
	% increase	-65.0	–53.8		

*HIPV indicates drugs of high intrinsic pharmacological value; GPS, generic pharmaceutical specialties; SRI: serotonin reuptake inhibitors; coxibs, rofecoxib and celecoxib; NSAID, nonsteroidal antiinflammatory drugs alone.
Statistical significance: $P<.05$ except for antibiotics.

of novel products on the market, make it difficult to compare studies and therefore limit the external validity of the results. However, these unknowns do not invalidate the knowledge obtainable from studies of institutionalized patients, given that similarities can be assumed in clinical practice styles and organizational models such that these factors would not be expected to influence the results.

In earlier studies, interventions that combined informative feedback with printed material, periodic reminders and methods based on personalized interviews were found to be effective in improving prescribing quality.[19-20] In Spain several intervention strategies have been proposed to influence the use of generic drugs or improve specific situations.[21-24] The present study was based on available knowledge and on prior situation analysis, in a scenario involving a large number of centers, a large geographic area, differences in the numbers of residents at each center, differences in the types of care they provide, and wide variations in prescription practices. We attempted to use the most effective strategies on the basis of available resources; this was a useful practical exercise in clinical management since, on the basis of available scientific evidence and in situations of daily clinical practice, our aim was to favor the choice of the most cost-effective medications.

The quantitative results show that UIP and utilization of different therapeutic subgroups account for more than 55% of total pharmaceutical costs. This finding is similar to the results of other published studies.[13-14,25-27] In the intervention group, total costs for drugs and medical supplies were contained in comparison to the control group. This effect was a result of the efficiency of specific actions, which led to improvements in the utilization of UIP and better compliance with the targets for nighttime UIP consumption, improvements in the selection of cheaper products (with omeprazole being a case in point), and an increase in the percentage use of GPS. The volume of prescriptions is such that the quantitative impact of small contributions is potentially considerable. In this connection the potential savings as a result of the program (in a simulated scenario based on total costs in excess of 524 thousand euros) are sufficient to justify the resources used and the possible effect of blinding on the results for the control group.

The percentages of HIPV drugs and GPS surpassed the proposed target figures, and of particular note was the 65.8% interannual increase in the intervention group (for a final relative increase of 13.1%). This indicator, together with the ratio of nighttime-to-total UIP consumption, were the two that received the greatest attention during the follow-up interviews. We note that that these improvements reflect considerable efforts in organizing care for the residents and in adapting to changes made by the health care teams at the nursing homes.

The indicators of relative drug use provide information on the relative proportions of use of different groups of drugs indicated for the same diagnosis. Our results for the use of first-line antiasthmatics and recommended NSAID reflect notable improvements in the quality of

Discussion
Key points

What is Known About the Subject

- Psychosocial impairment, a health status of functional dependence, and multiple chronic medical conditions are some of the factors that are characteristic of older persons, some of whom are institutionalized in nursing homes.
- Within this context, the therapeutic arsenal for the care of older persons is growing, and the number of residents in nursing homes is now double the number of older persons residing at home. These factors can increase the risk for adverse effects, drug interactions, and medication errors.

What This Study Contributes

- We show that the intervention tested here was able to improve the efficiency of drug prescribing in nursing homes, and was clearly effective in improving the quality of prescribing practices.

prescribing practices in the intervention group. These qualitative results showed a strong association with the qualitative results for different therapeutic subgroups, a result that further supports the consistency of the methods used here[28] and of the approach used for information management.

Possible limitations of the study involve factors of design, process and methodology which may have influenced comparisons between the intervention and control groups during the monitoring period. As possible sources of selection or classification bias, we note the nonrandom assignment of centers to the two groups, moving by nursing home residents to a different center, and possible changes in their health status or morbidity. A further factor to be taken into account is that the contractual conditions under which services were purchased from public and private health care service institutions responsible for managing some of the nursing homes may have differed, and this, in turn, might have influenced the results. Other potential sources of error are miscounts of prescriptions not attributed to a specific prescribing physician, and possible administrative errors in delivering prescription forms to individual physicians.

It is worth noting that in follow-up interviews, every effort was made to use simple language that was comprehensible to health professionals, on the basis of available information. This made it impossible to estimate more accurately certain quantitative or qualitative indicators such as the daily defined dose.[29] However, the volume of prescriptions, the evidence of regression upon the mean, and the design used for the study, suggest that our results are usable and comparable to those from other models. Additional studies should aim to confirm the consistency of the present findings.

Future research should promote actions designed to improve how the program is implemented, and to increase our knowledge of the diseases commonly seen in nursing home residents. An important aim should be to extend the intervention in a way that ensures greater homogeneity in prescribing practices at different centers, makes results from institutions responsible for operating the centers mandatory, and favors mechanisms of coordination with primary care services and pharmacists. An additional goal should be to develop a catalog of centers that allows the results of the intervention to be adjusted on the basis of confounding variables (differences between institutions, types of center and numbers of residents). More robust information management systems designed to classify patients on the basis of consumption of resources[30] should also be developed to further improve the models.

In conclusion, the preliminary results of the program, which should be interpreted with caution, show that the intervention was effective in improving the efficiency of prescribing practices at selected nursing homes. The methods used here were shown to increase the rational use of medications and improve the quality of prescription practices. Further follow-up on the results of the program over time will allow us to monitor trends and design scenarios that will make it possible to further optimize the distribution of resources.

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Participating Centres

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COMMENTARY

The Importance of Pharmacotherapeutic Care in Older Persons Residing in Nursing Homes

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Aging of the population or steady increases in life expectancy bring with them an increase in medical conditions characteristic of older persons, such as cardiovascular disease, degenerative diseases and cancer. In addition, the epidemiological profile of the population is changing, and diseases that were previously lethal are now associated with high survival rates.[1] Moreover, changes in lifestyle in our society—changes are making it increasingly hard to care for older persons at home. As a result the number of persons living in nursing homes is growing. Primary care is increasingly concerned with the care of older people, as seen at the most recent congress of the Spanish Society of Family and Community Medicine.[2]

The article by Sicras Mainar and colleagues[3] reports on the challenging approach—a quasi-experimental multicenter study—these authors used to examine improvements in appropriate drug prescribing practices. Although the authors themselves note the potential methodological limitations of their study to lie in the composition of the intervention and control groups, nonrandom assignment, and differences in the type (public or private) of nursing home, their study is undoubtedly an excellent addition to the scant number of publications on the topic in Spain.

The intervention carried out by the Pharmacy Unit of the Barcelonés Norte and Maresme health region comprised a combination of feedback with printed materials, periodic reminders and methods based on personalized interviews. At the present time, combined strategies such as that used by Sicras Mainer and colleagues are the types of intervention that have yielded evidence of the best results.[4]

The need to optimize pharmacotherapy for older persons is urgent. Excessive medication can affect quality of life in a direct manner, through redundant or unnecessary medication, and indirectly through iatrogenic effects. Other sources of problems are drug interactions, side effects, noncompliance with treatment and self-medication. These problems related with use of medications have been shown to be worse in older patients living in retirement or nursing homes.

To measure the results of their intervention, Sicras Mainar and colleagues used indicators that are common in primary care to measure general features of prescribing, such as the proportion of generic pharmaceutical specialties and the use of drugs with high intrinsic pharmacological value, along with specific indicators for groups of drugs used to treat respiratory illness, analgesics and antibacterials, and to measure choice of drug or relative drug use. The authors also included quantitative indicators for the use of drugs to treat peptic ulcer, antidepressants and antihypertensives. Another recent study of indicators of prescribing practices in retirement homes looked at these groups of drugs but also tracked prescriptions for benzodiazepines and hypnotics, which are widely used for older patients. This study also investigated compliance of prescribing practices with the recommendations in the health service formulary.[5]

In this case the authors based the choice of indicators on the *Guía Farmacoterapéutica Marco* (Pharmacotherapeutic Guideline Framework) for residential nursing homes, an indispensable document for any type of intervention, and of fundamental importance, moreover, for clinical decision-making by clinicians who care for older persons. These guidelines were prepared by several autonomous communities, i.e., Valencia, the Basque Country, and Madrid. In the United Kingdom, the National Health Service has developed a National Service Framework for Older People which includes a specific document that aims to improve the use of medications in this population.[6]

In addition to the importance of medications, the authors drew attention to the importance of other medical care products in this population, in which more than one-third of the costs are for urinary incontinence products. Simple management interventions have the potential here for important repercussions on efficiency.

One element that comes to the fore in the discussion section of this article is the potential limitation imposed by the fact that prescriptions were reviewed, but the reasons that motivated the prescriptions in the first place were not examined. Undoubtedly, aside from the issues noted above, additional work is needed in efforts to improve care for older patients. Such efforts may include automatization of prescription ordering and ful-

fillment, the integration of care for medical conditions common in older patients into the services provided by primary care centers, and a system to make medical records available at primary care centers (whether or not nursing and primary care centers are to be amalgamated). Moreover, additional support is needed for therapeutic services provided through programs for integrated pharmacotherapeutic care at residential facilities for older persons. In this area the experience of primary care pharmacists offers the potential to optimize and enhance prescribing practices, as shown in the article by Sicras Mainar and colleagues. This is clearly an important issue that is bound to have important consequences for the care of older persons and their quality of life.

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