ORIGINAL ARTICLES

Knowledge of and Attitudes and Adherence to the Spanish Guidelines for Asthma Management (GEMA) Among Spanish Health Care Professionals: The GEMA TEST Project

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OBJECTIVE: Health care professionals' adherence to asthma guidelines is believed to be low. The aim of the present study was to determine the knowledge, attitudes, and adherence of Spanish health care professionals with respect to the Spanish Guidelines for Asthma Management (GEMA).

MATERIAL AND METHODS: A multiple choice test with 15 questions was constructed. Items assessed knowledge of and opinions and adherence to asthma guidelines in general and the GEMA in particular. Test completion was voluntary, individual, and anonymous.

RESULTS: A total of 1066 physicians and nurses took the test. The sample consisted of 241 (22.6%) respiratory medicine specialists and 244 (22.9%) nurses from the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR), 221 (20.7%) pediatric pulmonologists from the Spanish Society of Pediatric Pulmonology (SENP), 220 (20.6%) general practitioners from the Spanish Society of Family and Community Medicine (semFYC), 181 (17%) general practitioners from the Spanish Society of Rural and General Medicine (SEMERGEN), and 38 (3.6%) others. Asthma guidelines were considered useful or very useful by 805 (76%), and 771 (72%) stated they were familiar with the GEMA. However, 388 (36%) admitted that they followed guidelines seldom or never. The level of adherence to the GEMA was poor for 243 (30.3%) respondents. The multivariate analysis revealed that low adherence was associated with the following characteristics: coming from the geographic center or south of Spain; being a primary care physician, unfamiliar with guidelines, or unconvinced of their utility; and not being a user of spirometry.

CONCLUSIONS: Even though the majority of Spanish health care professionals surveyed seem to know of the GEMA, their adherence to those guidelines is very low. Educational programs that seek to improve knowledge of asthma guidelines should consider the profile of professionals with low adherence to the GEMA so as to include educational strategies that target them specifically.

Key words: Asthma. Asthma therapy. Spanish guidelines for the management of asthma (GEMA).

Opinión, conocimientos y grado de seguimiento referidos por los profesionales sanitarios españoles de la Guía Española para el Manejo del Asma (GEMA). Proyecto GEMA-TEST

OBJETIVO: Se sospecha que el seguimiento de las recomendaciones terapéuticas del asma entre los profesionales sanitarios es bajo. El presente estudio se ha realizado con el objeto de determinar la opinión, el conocimiento y cumplimiento de las recomendaciones de la Guía Española para el Manejo del Asma (GEMA) entre los profesionales sanitarios españoles.

MATERIAL Y MÉTODOS: Se elaboró un cuestionario de 15 preguntas de respuesta múltiple que recogían la opinión y conocimiento general sobre las guías de asma, el grado de seguimiento de éstas y, específicamente, de las recomendaciones diagnósticas y terapéuticas de la GEMA. El cuestionario se cumplimentó de forma voluntaria, individual y anónima.

RESULTADOS: Rellenaron el cuestionario 1.066 profesionales: 241 (22,6%) neumólogos y 244 (22,9%) profesionales de enfermería de la Sociedad Española de Neumología y Cirugía Torácica (SEPAR); 221 (20,7%) pediatras-neumólogos de la Sociedad Española de Neumología Pediátrica (SENP); 220 (20,6%) médicos de atención primaria de la Sociedad Española de Medicina de Familia y Comunitaria (semFYC); 181 (17%) médicos de atención primaria de la Sociedad Española de Medicina Rural y Generalista (SEMERGEN), y 38 (3,6%) de otras sociedades. De ellos, 805 (76%) opinaron

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que las guías para el manejo del asma eran útiles o muy útiles y 771 (72%) conocían la GEMA, pero 388 (36%) reconocían que seguían poco o nunca sus recomendaciones. Entre los médicos participantes, 243 (30,3%) fueron clasificados como malos cumplidores de la GEMA. El análisis multivariante reveló que los profesionales provenientes de las áreas centro y sur españolas, los de atención primaria, los poco convencidos de la utilidad de las guías o los que no las conocen, y los que no empleaban la espirometría se asociaron con un menor cumplimiento de la guía.

CONCLUSIONES: Si bien la mayoría de los profesionales sanitarios españoles encuestados conoce y estima positiva la GEMA, el grado de cumplimiento de ésta es bajo. Los futuros programas docentes encaminados a difundir las guías de asma deberían considerar el perfil del médico no cumplidor de la GEMA e incorporar estrategias educativas dirigidas específicamente a dichos profesionales.

Palabras clave: *Asma. Guías de tratamiento del asma. Guía Española para el Manejo del Asma (GEMA).*

Introduction

A large number of good practice guidelines have been published over the past 15 years, on asthma and many other diseases. Asthma recommendations are now available for both Spanish practitioners[1] and the international community.[2] Such guidelines are of undoubted scientific value because they encourage convergence on terminology, diagnosis, and treatment, but questions have arisen regarding how they are implemented and the level of adherence among health care professionals. Some studies have shown, for example, that therapeutic recommendations are not followed when physicians prescribe for 58% to 62% of patients,[3,4] even though simple computer-based tools to help with decision-making are on hand.[5] By way of example, the prophylactic use of inhaled corticosteroids continues to be low,[6] and at least 40% of patients are prescribed rescue medication.[7] Meanwhile, a direct correlation between poor adherence to good practice guidelines and asthma morbidity has been demonstrated by a larger number of visits to emergency departments and a higher rate of hospitalization.[8] Furthermore, morbidity indices are known to improve considerably when recommendations are followed, as shown by a reduction in asthma severity, exacerbations, and resource consumption.[9,10]

The Spanish Guidelines for the Management of Asthma, commonly known by the acronym GEMA,[1] were the fruit of broad-based consensus among asthma specialists in Spain. The statement was issued with the participation of several national scientific societies: the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR), the Spanish Society of Pediatric Pulmonology (SENP), Spanish Society of Rural and General Medicine (SEMERGEN), and the Group for Respiratory Medicine in Primary Care (GRAP). Although these scientific societies made commendable efforts to promote the guidelines in the 2 years following their publication, the real impact of GEMA among practitioners was unknown. Therefore, this study was designed to determine the level of knowledge of and adherence to these guidelines, as reported by Spanish health care professionals. On the one hand, the results will potentially provide an estimate of how widely the GEMA criteria are being implemented in Spain, and on the other they may help identify specific needs, related to either diagnosis or treatment, within certain communities of practice.

Materials and Methods

Study Design and Population

The study was designed to assess the level of knowledge of and adherence to the GEMA recommendations among Spanish health care professionals. A questionnaire consisting of 15 questions with closed multiple-choice responses was developed to be answered by physicians and nurses belonging to the scientific societies that participated in formulating the GEMA.

The questionnaire was distributed among physicians and nurses in respiratory medicine (through SEPAR) and practitioners of pediatric respiratory medicine (through SENP) and primary care (through SEMERGEN and the Spanish Society of Family and Community Medicine [semFYC]). Participation in the survey was voluntary, individual, anonymous, and immediate (not delayed), taking place at the beginning of sessions held during the scientific societies' national meetings and conferences in 2005.

Questionnaire

The questionnaire was composed of 15 items with closed multiple-choice responses. It could be answered quickly, in about 8 minutes; the first 5 questions gathered information about the respondent's age, sex, specialty, geographic location, and number of asthma patients seen every month. Subsequent questions concerned the respondent's opinion of the effectiveness of asthma guidelines (item 6); the level of adherence to recommendations (items 8, 10, and 11); general knowledge (items 7 and 9); specific knowledge related to diagnosis (case-based items 12 and 13: 12, on a case related to an understanding of clinical severity; and 13, related to an understanding that a skin prick test does not itself allow a diagnosis of asthma); and therapy (case-based items 14 and 15: 14, on whether short-acting β_2-agonists are administered on demand in an ongoing treatment regimen for the disease; and 15, related to an understanding of how to adjust dosages in chronic treatment). Nurses did not answer the last 4 items on specific diagnostic and therapeutic knowledge. An answer sheet that could be read optically was designed and responses were automatically entered into a database.

Statistical Analysis

Descriptive statistics were compiled for the entire population sample. Results for each item were expressed as percentages and compared between specialist groups by means of the χ^2 test. Statistical significance was set at a value of P less than .05. Analyses were carried out with SPSS version 14 (SPSS for Windows, Chicago, Illinois, USA).

The level of GEMA adherence among the respondents in respiratory medicine, pediatrics, and primary care was established by combining responses to items 8 (level of

adherence to recommendations), 11 (general knowledge), 13 (specific knowledge related to diagnosis), and 14 (specific knowledge related to therapy). Responses to those 4 items were weighted to provide scores that ranged from 0 points (lowest) to 12 points (highest) to reflect lesser or greater adherence or general and specific knowledge. The sum of points for all 4 items provided a score for a new variable termed GEMA adherence level to allow stratification of the sample into 3 groups with similar numbers of respondents in each: physicians with poor adherence (total score <2 points), physicians with low adherence (between 3 and 4 points), and physicians with good adherence (≥5 points). Logistic regression was used to define a profile of the physician with poor adherence. The new variable termed GEMA adherence level was dichotomized to compare the rates of poor and good adherence. All independent variables were included in the model whether or not they were significant in the bivariate analysis.

Results

A total of 1066 questionnaires were returned; 59% came from women. Eighty-four percent of the respondents were between 30 and 60 years old. The distribution by specialty was as follows: SEPAR returned 241 (22.6%) questionnaires from respiratory medicine specialists and 244 (22.9%) from nurses; SENP, 221 (20.7%) questionnaires from pediatric pulmonologists; semFYC, 220 (20.6%) from primary care physicians; SEMERGEN, 181 (17%) from primary care physicians; and 38 (3.6%) came from other sources. Some respondents reported having more than one specialty.

Respondents from Aragon, Catalonia, Valencia, Murcia, and the Balearic Islands together returned 476 questionnaires (45%). Approximately 41% (439 respondents) treated more

TABLE 1
Responses From the Total Sample and From Each Medical Specialty, Showing Age and Gender Distribution and Grouped by Reported Assessment of Familiarity With and Adherence to the Spanish Guidelines for the Management of Asthma (GEMA)[a]

	All (n=1066)	Respiratory Medicine: SEPAR (n=241)	Primary Care: SEMERGEN + semFYC (n=401)	Pediatrics: SENP (n=221)	Nursing: SEPAR (n=244)	*P* (Between Groups)
1. Demographic characteristics						
Respondents between 30 and 50 years old	645 (61%)	128 (57%)	242 (66%)	119 (58%)	118 (61%)	–
Men/Women, %	41/59	55/45	49/51	33/67	10-90	–
2. Opinion and general familiarity with asthma guidelines						
Usefulness of the GEMA guidelines						<.0001
Little or no use	33 (3%)	2 (1%)	22 (6%)	5 (2%)	2 (1%)	
Moderately useful	221 (21%)	36 (16%)	95 (26%)	40 (19%)	36 (19%)	
Useful or very useful	805 (76%)	185 (83%)	253 (68%)	161 (78%)	152 (80%)	
Declared familiarity with guidelines						
GINA	672 (63%)	187 (83%)	179 (48%)	183 (89%)	75 (38%)	<.001
GEMA	771 (72%)	207 (92%)	204 (55%)	178 (86%)	127 (65%)	<.001
semFYC guidelines	398 (37%)	47 (21%)	255 (69%)	35 (17%)	40 (20%)	<.001
Other	161 (15%)	51 (23%)	33 (9%)	43 (21%)	18 (9%)	<.001
None	59 (5%)	5 (2%)	16 (4%)	4 (2%)	34 (17%)	<.001
3. Guidelines followed						
Reported degree of guideline adherence						<.001
Never or seldom	388 (36%)	34 (15%)	165 (45%)	48 (24%)	115 (59%)	
Always or fairly often	655 (61%)	195 (85%)	202 (55%)	151 (76%)	70 (41%)	
How asthma control is assessed[b]					–	
Only with ordinary interview	184 (23%)	31 (14%)	81 (22%)	72 (35%)	–	<.001
Use of specific questionnaire	196 (24%)	73 (33%)	71 (19%)	52 (25%)	–	.001
Spirometry	563 (69%)	185 (83%)	258 (69%)	110 (53%)	–	<.001
Bronchial responsiveness test	130 (16%)	55 (25%)	54 (15%)	21 (10%)	–	<.001
Measure of bronchial inflammation[c]	63 (8%)	44 (20%)	12 (3%)	7 (3%)	–	<.001
Educate patients						<.001
Never or sometimes	704 (66%)	130 (61%)	294 (84%)	122 (63%)	123 (71%)	
Always	168 (16%)	54 (25%)	27 (8%)	38 (20%)	37 (21%)	
4. Specialized knowledge of asthma[b]						
Can classify severity	143 (19%)	52 (25%)	49 (14%)	42 (23%)	–	.008
Know that a prick test does not establish an asthma diagnosis	581 (82%)	177 (86%)	242 (75%)	162 (88%)	–	.009
Do not know that short-acting β_2-adrenergic drugs are administered on demand	503 (69%)	157 (75%)	190 (57%)	156 (85%)	–	<.001
Know how to adjust maintenance therapy	239 (33%)	62 (31%)	94 (28%)	83 (43%)	–	<.001

Abbreviations: GINA, Global Initiative for Asthma; SEMERGEN, Spanish Society of Rural and General Medicine; semFYC, Spanish Society of Family and Community Medicine; SENP, Spanish Society of Pediatric Pulmonology; SEPAR, Spanish Society of Pulmonology and Thoracic Surgery.
[a]Data are number of respondents followed in parentheses by the percentage of that group, unless otherwise indicated.
[b]Responses from nurses and specialists other than those in respiratory medicine, primary care, or pediatrics were excluded.
[c]Analysis of sputum eosinophil count or exhaled nitric oxide concentration.

TABLE 2
Degree of Adherence to the Spanish Guidelines for the Management of Asthma (GEMA) Based on a Combined Score for Answers to Items 8, 11, 13, and 14, According to Medical Specialty, Demographic and Geographic Location, and Personal Assessment of Asthma Guideline Familiarity (n=801)

	Adherence to the GEMA						*P*
	Poor (n=243)		Low (n=306)		Good (n=252)		
	No.	%	No.	%	No	%	
Age, y							
<40	76	25	130	42	101	33	.033
40-49.9	93	33	108	39	77	28	
≥50	72	34	68	32	73	34	
Medical specialty							
Primary care (semFYC)	91	43	101	47	22	10	<.0001
Primary care (SEMERGEN)	88	50	58	33	30	17	
Respiratory medicine (SEPAR)	39	18	70	31	115	51	
Pediatrics (SENP)	37	18	81	39	88	43	
Region							
North (Galicia, Asturias, Cantabria, Basque Country, Navarre)	41	30	40	29	56	41	.067
Center (Castile and Leon, Castile-La Mancha, Madrid)	57	36	60	38	40	26	
South (Extremadura, Andalusia)	49	30	68	42	45	28	
East (Aragon, Catalonia, Valencia, Murcia, Balearic Islands)	91	28	130	40	102	32	
Canary Islands, Ceuta, and Melilla	3	17	7	39	8	44	
Number of asthmatics attended each month							
≤20	170	38	174	38	109	24	<.0001
>20	72	21	130	38	138	41	
Opinion on usefulness of guidelines							
Little or no use	16	55	9	31	4	14	<.0001
Moderately useful	66	38	63	37	42	25	
Useful or very useful	159	27	234	39	206	34	
Declared familiarity with guidelines							
Not familiar with any	16	64.0	3	12.0	6	24.0	0.001
International guidelines, GINA	123	22.4	224	40.8	202	36.8	
Spanish guidelines, GEMA	138	23.4	235	39.9	216	36.7	
Guidelines from semFYC	114	33.8	146	43.3	77	22.8	
Other guidelines	22	17.3	48	37.8	57	44.9	

Abbreviations: GINA, Global Initiative for Asthma; SEMERGEN, Spanish Society of Rural and General Medicine; semFYC, Spanish Society of Family and Community Medicine; SENP, Spanish Society of Pediatric Pulmonology; SEPAR, Spanish Society of Pulmonology and Thoracic Surgery.

than 20 patients each month. A total of 436 (41%) declared they had learned of the GEMA through the pharmaceutical industry, 374 (35%) through promotion by authors and collaborators, and 370 (35%) through seminars or workshops.

Table 1 displays results for the whole sample and by specialties, by demographic variables, and according to attitudes toward and level of general knowledge of asthma guidelines and adherence to the GEMA. Among the noteworthy results was the finding that 805 respondents (76%) assessed asthma management guidelines to be useful or very useful and 771 (72%) were familiar with the GEMA; yet 388 (36%) declared they followed the guidelines seldom or never. Only 143 physicians (19%) were able to classify disease severity and 239 (33%) were able to treat it in accordance with GEMA criteria. Between-group comparisons showed that knowledge of and adherence to the GEMA were lower among primary care physicians and nurses (excluding items on specific knowledge from the comparison for nurses).

Classification by the new variable termed GEMA adherence level showed that in 243 cases (30.3%) adherence was poor, in 306 (38.2%) it was low, and in 252 (31.5%) it was good. Table 2 shows the distribution of analyzed variables for all 801 physicians surveyed in all categories (respiratory medicine, pediatrics, and primary care) according to GEMA adherence level (poor, low, good). Univariate analysis revealed poor adherence to be associated with the following variables: age between 40 and 60 years (not over 60), primary care specialization, an opinion that guidelines were of little use (only 11 stated that they were "absolutely useless"), and being unfamiliar with any guideline or only knowing of the statement issued by the semFYC.

Multivariate analysis (Table 3) showed that the profile of the nonadherent physician was significantly associated with practicing in a region in the center or south of Spain, primary care specialization, an opinion that guidelines were of little use or lack of familiarity with them, and not using spirometry for patient follow-up. It should be noted

TABLE 3
Results of Multivariate Analysis, Showing the Significant Variables Included in the Model

	P	Odds Ratio	95% Confidence Intervale	
			Lower	Upper
Region	.002			
North (Galicia, Asturias, Cantabria, Basque Country, Navarre)		1		
Center (Castile and Leon, Castile-La Mancha, Madrid)	0.003	3.03	1.46	6.28
South (Extremadura, Andalusia)	0.333	1.45	0.68	3.07
East (Aragon, Catalonia, Valencia, Murcia, Balearic Islands)	0.849	0.94	0.50	1.78
Canary Islands, Ceuta, Melilla	0.113	0.23	0.04	1.42
Medical speciality	<.001			
Respiratory medicine (SEPAR)		1		
Primary care (semFYC + SEMERGEN)	<.001	10.00	5.45	18.33
Pediatrics (SENP)	.153	0.62	0.32	1.20
Opinion on usefulness of guidelines	.011			
Useful or very useful		1		
Moderately useful	.015	2.04	1.15	3.62
Little or no use	.049	4.15	1.01	17.10
Patient follow-up				
No standardized interview	.017	2.02	1.14	3.60
No spirometry	<.001	5.98	3.42	10.45
Not familiar with the Spanish asthma guidelines (GEMA)	.047	1.77	1.01	3.11

Abbreviations: SEMERGEN, Spanish Society of Rural and General Medicine; semFYC, Spanish Society of Family and Community Medicine; SENP, Spanish Society of Pediatric Pulmonology; SEPAR, Spanish Society of Pulmonology and Thoracic Surgery.

that the number of patients treated each month and the physician's age (included in the univariate analysis) were not included in the multivariate model.

Discussion

The GEMA statement[1] was published in 2003 with the principal aim of bringing together available scientific evidence that would contribute to improving the care and management of asthmatic patients in Spain. The recommendations and other content in the statement were appropriate for the Spanish context, in terms of both diagnostic and therapeutic resources available in clinical practice. The writing of the text was multidisciplinary thanks to the participation of experts from several Spanish scientific societies related to respiratory medicine, pediatric respiratory medicine, and primary care. The resulting guidelines reflected the broad consensus of Spanish asthma experts at that time. After publication, considerable effort was made to promote the GEMA, with between 250 and 300 formal presentations at conferences and meetings of varying sizes. Some 200 000 versions of the document itself and related documents (a version translated to Catalan, a pocket guide, a patient guide, and a trainer's guide) were printed, and the participating societies and pharmaceutical industry representatives undertook the task of distributing them. Electronic versions for use in Palm and Pocket PC computers were produced, and the GEMA was also made available on an open-access webpage (http//www.gemasma.com)[11] that was visited 445 472 times in the first 6 months after publication.

Results from our study of the impact of the GEMA among Spanish health care professionals in the 2 years following publication have shown that the aim of spreading knowledge of the guidelines was achieved, but that familiarity had not been translated into changes in routine clinical practice. In fact, although the promotional campaign was highly successful given that familiarity with the GEMA was reported by 72% of the respondents (a higher proportion than the 63% familiar with the guidelines of the Global Initiative for Asthma [GINA]). Only 61% reported following guidelines, and knowledge of their recommendations was deficient for both diagnosis (19%) and treatment (33%). Among the participating physicians, 243 (30.3%) showed a low level of adherence to the GEMA. It is important to remember that these data come from responses to a survey rather than observations of actual clinical practice and, furthermore, that the respondents were volunteers (not a population-based sample); this means that adherence is probably even worse than reported by the participants. Although this type of survey study can only provide an approximate answer to a question, as there are methodological limitations, we note that the results we report agree with many other past[3,4] and recent[12,13] studies, even for other diseases in the Spanish context.[14]

Although guidelines are necessary, and their quality is improving,[15] their efficiency in affecting actual practice is now questioned. The debate centers on what might be the best way to translate evidence into routine clinical practice, or specifically how to improve the application or implementation of recommendations.[16-18] The most recent version of the GINA guidelines (2006)[19] even contained a section addressing this issue. In a review of 19 guidelines, Lomas[20] found that isolated publication and promotion of guidelines by other complementary actions have been ineffective in bringing about changes in how professionals behave. The problem, therefore, is not one of bringing information to the professionals—our data and those of others show that the information is there—but rather of how to change attitudes so that knowledge

(evidence) can be translated into action (good practice). Recent studies have proposed various measures: the use of personal data assistants,[21] which have proven to be highly effective aids to therapeutic decision-making[22]; the integration of action checklists into routine clinical practice in such a way that they are required to be filled in and confirmed[23,24]; educational programs targeting small groups organized as workshops or seminars[25]; simplification of messages organized into tables, flow charts, and algorithms[26]; emphasizing the great benefits to patients that can be attained if guidelines are followed when designing the content of educational programs[27]; and providing the practitioner with basic resources (a standardized medical history, spirometry, peak flow measurements), particularly in the primary care setting.[28]

We believe that the results of the multivariate analysis from this study will be of particular interest when strategies are devised to improve adherence to guidelines. Our analysis identified that the practitioner who may display poor adherence is one who is working in a central part of Spain (both communities of Castile) or in the south, who is a primary care physician, who is unfamiliar with the guidelines or little convinced of their usefulness, and who does not use spirometry routinely to monitor patient progress. Therefore, in addition to taking the usual steps considered adequate for familiarizing most professionals with guidelines, future promotional programs should specifically target central and southern Spain and primary care physicians. Educational programs, in addition to making the statements available, should also promote them and convince practitioners that guidelines reflect ideal practice that will lead to benefits for patients if followed properly. Additionally, the routine use of spirometry should be encouraged.

This study also identified certain differences among the 4 professional groups studied. In general, respiratory medicine specialists and pediatric pulmonologists reported a significantly higher level of adherence to and knowledge of guidelines in general, and the GEMA in particular. The scarce application of a formal patient education scheme (used by 16% of respondents) was noteworthy and the very low application in primary care (8%) was worrying. The use of spirometry among primary care physicians was higher than would have been expected (69%) based on the ASES study,[29] in which nearly 200 Spanish physicians were surveyed and only 31% of the asthmatics routinely followed by those physicians had recently undergone spirometry. It was particularly clear that knowledge of guidelines in general was significantly lower among nurses than among physicians, and that nurses scarcely undertook education of the asthmatic patient (only 20% applied an educational program) even though nurses are meant to take a leadership role in this aspect.

Noteworthy among the results of our study is the indirect confirmation that the pharmaceutical industry in Spain plays an important role in the continuing professional development of practicing physicians: 41% of the sample reported that they learned of the GEMA statement by that means. It is also noteworthy, however, that only 19% of the physicians were able to correctly classify severity in the case that was presented in one of the questions. This circumstance is consistent with the lack of knowledge of the GINA guidelines, and hence adherence to them, among health care professionals; the most recent version of the GINA guidelines[19] supports the classification of asthma based on degree of control of disease rather than severity.

Certainly this study confirms that the effort made to publish and promote the GEMA has led to a broad base of familiarity with the statement among the Spanish professionals who are involved in the management of asthma. Familiarity has not translated to an ideal level of knowledge of the statement's diagnostic and therapeutic recommendations, however. Furthermore, serious knowledge gaps were identified in some groups, particularly nurses and central and southern regional primary care physicians. These observations should be taken into consideration in future revisions of the GEMA, which should offer recommendations that are easier to remember and follow and that are perhaps incorporated into computer platforms, whether for desktop or more portable computers, in order to aid on-the-spot clinical decision-making. Finally, our findings should contribute to the development of a training program that specifically targets nurses and primary care physicians.

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