

Health Service Research

Management and referral of patients with severe and poorly controlled asthma in primary care

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Abstract

Background. Over 50% of treated patients with asthma in Europe are not well controlled. Their management in primary health care (PHC) differs from that in specialized care, and there is no real coordination between the two.

Objectives. To identify barriers and solutions to improving the management of patients with severe and poorly controlled asthma and the communication between specialists and PHC, and to reach a consensus on the criteria for referral patients.

Methods. An observational study using a modified Delphi technique. About 79 physicians from PHC, pneumology and allergy fields from different Spanish regions were invited to participate via an online questionnaire. Consensus was reached on an item when more than two-thirds of the panel members scored within the 3-point category (1–3 or 7–9) containing the median and the interquartile range of answers had to be ≤ 4 points.

Results. Response rate: 52%. After the second round, consensus items were 40 (62.5%): of which 37 in agreement and 3 in disagreement. Around 92.68% of respondents agreed that it would be useful to incorporate questionnaires for asthma control into PHC computer-based searches. About 100% of participants agreed that clear consensus criteria between PHC and specialists must be determined to decide when a patient with asthma is referred from PHC to specialist or vice versa. Ten of the proposed criteria reached consensus agreement.

Conclusion. The failure to use guidelines and specific questionnaires for asthma control in PHC is one reason why there is underdiagnosis and poor control of asthma. Some strategies to improve the asthma care management emerged from the survey results.

Key words: Asthma, Delphi technique, primary health care, referral and consultation.

Introduction

Asthma is a serious global health problem affecting all age groups. Its prevalence is increasing in many countries, especially among children. Despite recent therapeutic advances, asthma is a prevalent chronic disease that still imposes an unacceptable burden on health care systems (1). Although there are published clinical practice guidelines on asthma management whose aim is to achieve an adequate level of control of asthma, international surveys provide ongoing evidence for suboptimal asthma control in many countries (2). Nowadays, >50% of treated patients in Europe do not have adequate control over their asthma (3). The most important causes of poorly controlled asthma—apart from the severity of the disease itself—include poor inhalation technique, lack of therapeutic adherence, presence of comorbidities, misdiagnosis of asthma, continued exposure to irritants or sensitizers and lack of concordance between physicians' assessments of asthma control and guideline assessment recommendations (2,4).

The Spanish health care system follows a continuity of care model and is divided into two levels that are as follows: primary care and specialized/hospital care. Primary health care (PHC) physicians are responsible for the diagnostic process and can usually manage most asthma patients, but some clinical situations require referral of patients to specialist. The criteria for referring patients—based on consensus—should be re-evaluated because there have been substantial variations in the care management of the health care systems.

PHC physicians play a key role in treating patients with asthma and may decisively contribute to reducing the percentage of patients with poorly controlled asthma (5). The management of asthmatic patients in PHC differs from that in specialized health care (SHC), and there is no real coordination between the two (6). Improvements in training and health care by PHC, as well as a better relationship with SHC, can contribute to reducing the morbidity of the disease and the associated costs (7).

Maciejewski *et al.* (8) reviewed the literature in order to identify which adult asthma disease-management approaches were most effective. However, there was not enough evidence to recommend any particular intervention. Therefore, consensus studies can be a useful complement to resolve all the issues that affect asthma control. The aim of this study is to identify the barriers and solutions to improving the management of patients with severe and poorly controlled asthma and the communication between SHC and PHC physicians, and to reach a consensus among PHC and SHC (pulmonology and allergy) physicians on the criteria for referral patients.

Methods

This observational study was performed in 2014 using a modified Delphi technique, following recommendations by the University of California, Los Angeles (UCLA) and the RAND (Research AND Development) Corporation (9). In the first stage, anonymous individual opinions were collected from a panel of experts. Results were disseminated among the panel in a second survey round, thereby allowing participants to ponder obviously divergent positions within the group.

Participants

In order to define the contents of the questionnaire and select the expert panel, a scientific committee was first set up, including four PHC physicians, four pneumologists and two allergists with experience in managing asthma in adults; all of them were members of scientific societies, professors and/or key opinion leaders.

The expert panel, which was composed of multidisciplinary professionals (panelists) of proven experience, was responsible for replying to the electronic survey. Eligibility criteria were as follows: (i) >5 years of experience in asthma management care and (ii) physician in the field of asthma. This study used snowball sampling, in which 15 key opinion leaders from different Spanish regions (Valencia, Alicante, Cordoba, Malaga, Bilbao, Madrid, Lugo, Barcelona, Seville and Cantabria) were approached to participate and recruit additional participants who met the eligibility criteria. In total, 79 physicians (panel members) from PHC, pneumology and allergy fields from different Spanish regions were selected and invited to participate via an online questionnaire. No sample size was calculated, since there is a lack of agreement around the optimal expert sample size and no criteria against which a sample size choice could be judged.

Process

In a first face-to-face meeting with the scientific committee, proposals were raised regarding controversial issues in asthma management in PHC and in its relationship with SHC. After this debate, a questionnaire was drawn up and unanimously approved by all members of the scientific committee (Tables 1–3). A cover letter describing the study was sent to all panel members for their approval and signature. In the first round, the questionnaire elicited individual and anonymous opinions from each expert, who answered via e-mail. A second-round questionnaire was then sent, thereby indicating the items that did not reach the consensus and including the explanatory comments included in panelists' questionnaires.

Instrument

The survey consisted of 64 items that are divided into three blocks. The first block (25 items) addressed the current situation of severe asthma management in adults in PHC. The second block (28 items) focused on referral and consultation in adults with severe asthma from PHC to allergy or pulmonology SHC. The third block (11 items) dealt with the communication between PHC and SHC regarding patients with severe asthma to identify opportunities for improvement.

In order to facilitate the analysis of responses, a unique rating scale (9-point ordinal Likert-type scale) for all the items was proposed (minimum 1, completely disagree; maximum 9, completely agree). Three response categories were established (1–3: disagree; 4–6: neither agree nor disagree and 7–9: agree). The questionnaire offered participants the possibility to include free observations and a final section to suggest new items, if they wished.

Analysis

We considered consensus to have been reached on an item when more than two-thirds of the panel members scored within the 3-point category (1–3 or 7–9) containing the median. In this case, if the median was ≤ 3 , a consensus disagreement was reached; and if the median was ≥ 7 , a consensus agreement was reached. Moreover, the interquartile range (IQR) of answers had to be ≤ 4 points for an item to be considered as having consensus. In both rounds, identical criteria were applied to discriminate consensus items. The questionnaire results were analyzed by the scientific committee.

Results

A total of 41 physicians replied to the questionnaire, for a response rate of 52% (5 of them were allergists, 7 were pneumologists and the rest were PHC physicians). After the first round, panelists reached

Table 1. Items which reached consensus agreement or disagreement about the current situation of severe asthma management in adults in primary health care (Block 1 of the questionnaire) and percentage of panel members who scored the consensus category

Block 1. Items with consensus agreement	%
1. It would be useful to incorporate questionnaires for asthma control into PHC computer-based searches ^a .	92.68
2. It would be useful to incorporate guidelines on asthma management into PHC computer-based searches ^a .	87.80
3. In clinical practice, questionnaires such as the ACT and the ACQ are rarely used to assess the degree of asthma control in PHC.	85.37
4. Time constraints hinder the implementation of guidelines such as GEMA or GINA ^a .	78.05
5. Spirometry is a test available in most primary care centers ^b .	76.47
6. In their health records, patients often report better disease control than what ACT or ACQ questionnaires reflect ^a .	75.61
7. In PHC, there is generally underdiagnosis of asthma in adults ^a .	70.73
8. In PHC, only clinical questions in health records are usually used to assess the degree of asthma control ^a .	68.29
9. In PHC, severe asthma is often confused with poorly controlled asthma ^a .	68.29
10. In PHC, there is generally underdiagnosis of severe asthma in adults ^b .	67.65
11. In PHC, severe asthma is often confused with other diseases such as COPD, heart disease or bronchiectasis ^b .	67.65
Block 1. Items with consensus disagreement	
1. The concept of severe asthma is not clearly defined in the GEMA guidelines ^b .	70.59
2. The concept of severe asthma is not clearly defined in the GINA guidelines ^b .	67.65

ACT, Asthma Control Test; ACQ, Asthma Control Questionnaire; COPD, chronic obstructive pulmonary disease; GEMA, Guía Española de Manejo del Asma. GINA, Global Initiative for Asthma; PHC, primary health care; SHC, specialized health care.

^aReached in the first round.

^bReached in the second round.

a consensus on 31 (48.4%) of the 64 items: 30 in agreement and 1 in disagreement. After the second round, the number of consensus items increased to 40 (62.5%): 37 in agreement and 3 in disagreement. Therefore, out of the 37 consensus items in agreement, 30 were in the first round and 7 in the second round, whereas out of the 3 consensus items in disagreement, 1 was in the first round and 2 in the second round. The result of the evaluation of each item is shown in [Supplementary Data](#) as a median with IQR.

Consensus results from the first block of the questionnaire appear in [Table 1](#) and provide an overview of concerns that may contribute to poor asthma control in the current health care system. PHC rarely uses the Asthma Control Test (ACT) or the Asthma Control Questionnaire (ACQ), thereby opting to use only clinical questions. Moreover, the limited time for consultation does not allow the implementation of guidelines, there is underdiagnosis of asthma and severe asthma in adults, and primary care physicians often confuse severe asthma with other respiratory diseases or poorly controlled asthma. The possible consensus solutions to improve asthma control were to incorporate questionnaires and guidelines for asthma control into PHC computer-based searches.

Regarding the referral criteria from PHC to specialist, all the respondents (100%) agreed that clear consensus criteria between PHC and SHC must be determined to decide when a patient with asthma is referred from PHC to SHC or from SHC to PHC. [Table 2](#) shows the consensus items and the percentage of panel members in favor of the majority opinion about the referral on severe asthma in adults. In addition, the results of this second block show some referral criteria to consider by PHC ([Table 2](#)).

Finally, the results of the third block of the questionnaire revealed that 67.65% of physicians think that the communication between PHC and SHC is weak regarding patients with severe asthma, and 95.2% agree that the relationship should be improved. Eight measures to achieve this goal met the criteria for consensus ([Table 2](#)).

Discussion

This consensus study provides insight into the current management of patients with asthma by primary care physicians, pneumology and allergy specialists in Spain. The failure to use asthma guidelines

and specific questionnaires for asthma control in PHC is one reason why there is underdiagnosis and poor control of asthma and severe asthma in adults. In relation to the referral criteria, all respondents agree that they should be consensual by PHC and SHC; 10 of the proposed criteria reached consensus agreement among participants from these services in our survey. In addition, most participants think that the relationship between PHC and SHC should be enhanced to improve the asthma care management, and some strategies emerged from the results.

About 7% of the population suffers from asthma, presenting with signs or symptoms and an obstructive ventilatory pattern in forced spirometry; however, only 27% of these are diagnosed. Of the 73% of undiagnosed asthmatic patients, 91% do not seek medical consultation for their symptoms, and the rest do but are not appropriately diagnosed (10). Concurring with these studies, our panel members agreed that there is general underdiagnosis of asthma in adults in PHC. The consequent lack of treatment may be an important factor in increasing asthma morbidity and mortality (11). The results of the questionnaire reflect the problems related to diagnosis at this level of care, such as the agreement that severe asthma is often confused with poorly controlled asthma and with other diseases, such as chronic obstructive pulmonary disease, heart disease or bronchiectasis. Thus, there is a need for better ongoing training to facilitate both differential diagnosis and treatment intensification before categorizing it as severe asthma. An Italian study revealed that asthma management is performed independently from the guidelines, although following them is more appropriate in patients with severe asthma (12). Another study carried out in >1000 PHC physicians in Israel confirmed that >40% of PHC physicians changed their therapeutic strategy after consulting the guidelines (13). Although the consulted literature does not show clear recommendations on how to improve guidelines consultations in clinical practice (8,14), our experts agreed that time constraints hinder the implementation of guidelines, and their incorporation into PHC computer-based searches would be useful. There are few bibliographic references in this regard, although a 2014 study in Ontario, Canada, concluded that the implementation of guidelines on electronic health records is feasible and useful (15). The panel members agreed that severe asthma is well defined in both the Spanish Guidelines on the Management of

Table 2. Items which reached consensus agreement or disagreement about the referral of patients with severe asthma between primary health care and specialists (Block 2 of the questionnaire) and the percentage of panel members who scored the consensus category

Block 2. Items with consensus agreement	%
1. Clear consensus criteria between PHC and SHC must be determined to decide when a patient with asthma is referred from PHC to SHC ^a .	100
2. Clear consensus criteria between PHC and SHC must be determined to decide when to refer a patient with asthma from SHC to PHC ^a .	100
3. In PHC, patients with severe asthma are appropriately referred to SHC ^b .	79.41
4. Many patients with severe asthma are unnecessarily treated in SHC ^b .	76.47
5. Severe asthma is appropriately evaluated in SHC ^a .	68.29
Block II. Items with consensus disagreement	
1. A patient with mild asthma referred to SHC must always be treated and followed up by SHC ^a . A patient must be referred from PHC to SHC	80.49
1. When there is no response despite an appropriate treatment.	97.56
2. When immunotherapy is required ^a .	97.56
3. For all patients with difficult-to-control asthma (asthmatic patients whose disease is characterized by insufficient or poor control, despite an appropriate therapeutic strategy, adjusted to the level of clinical severity) ^a .	97.56
4. In cases of severe persistent asthma according to the classification of asthma severity in adults of the GEMA guidelines ^a .	95.12
5. In cases of poorly controlled asthma according to the classification of asthma control in adults of the GEMA guidelines ^a .	90.24
6. In cases of patients at step 5 of the therapeutic stepwise approach to treatment in maintenance therapy of asthma in adults (in which the maintenance treatment of choice is high-dose inhaled corticosteroid + long-acting β -2 adrenergic agonist) ^b .	88.24
7. When treatments are required whose prescription falls within the purview of SHC, such as omalizumab ^a .	87.80
8. When a specific trigger is suspected (NSAIDs, allergens, etc.) ^a .	75.61
9. When the frequency of exacerbations increases, although they are not severe ^a .	73.17
10. When high doses of inhaled corticosteroids are required ^a .	70.73

GEMA, Guía Española de Manejo del Asma; PHC, primary health care; SHC, specialized health care.

^aReached in the first round.

^bReached in the second round.

Table 3. Items which reached consensus agreement or disagreement about the communication between primary health care and specialists regarding patients with severe asthma (Block 3 of the questionnaire) and the percentage of panel members who scored the consensus category

Block 3. Items with consensus agreement	%
1. A close relationship between PHC and SHC improves the quality of care services for patients with asthma ^a .	97.56
2. Improving the relationship between PHC and SHC regarding care services for patients with asthma is recommended ^a .	95.12
3. The relationship between PHC and SHC is weak as regards care services for patients with asthma ^b .	67.65
To implement the following measures might improve the relationship between PHC and SHC as regards care services for patients with asthma:	
1. Establishing a system of rapid access to SHC (outpatient consultation or hospital) ^a .	100
2. Granting access to a shared health record ^a .	97.56
3. Fostering meetings and joint clinical sessions ^a .	97.56
4. Developing a joint action plan of asthma management between PHC and SHC ^a .	97.57
5. Providing an e-mail address with which PHC physicians can make specific consultations with SHC physicians ^a .	97.56
6. Enabling online consultations from PHC to SHC physicians ^a .	95.12
7. Providing a contact telephone number or pager with which a PHC physician can find an SHC physician for specific consultations ^a .	95.12
8. Local adjustment to the national guidelines ^a .	90.24

PHC, primary health care; SHC, specialized health care.

^aReached in the first round.

^bReached in the second round.

Asthma [Guía Española de Manejo del Asma (GEMA)] (16) and the Global Initiative for Asthma (GINA) guidelines (1), which are the main reference guides in the management of asthma in Spain.

The panel members also agreed that the spirometry test is available in most PHC centers, although availability alone does not guarantee good management of the disease. It would be interesting to implement training programs to ensure proper use and interpretation of these diagnostic tools (17). Most participants agreed that the usual way to assess the degree of control of asthma in PHC is to rely on clinical questions, whereas the ACT and ACQ questionnaires are rarely used. These questionnaires objectively assess the level of

control of the disease, although the evidence supporting their use comes from non-randomized, observational or uncontrolled studies (level C evidence). According to 2009 GEMA guidelines (16), their use can be assessed, but the level of recommendation is weak (R2 recommendation: there is uncertainty about whether their implementation involves more benefits than disadvantages). Similarly, the panel considered that, in their health records, patients often report better disease control than what ACT or ACQ questionnaires reflect. Therefore, assessing the severity and the degree of control seems to be an unresolved issue in PHC on which more in-depth studies must be undertaken. In the 2016 GINA guidelines (1), a simple checklist

is proposed, which requires less time and can be applied to daily consultations.

Although most people with asthma can usually achieve good control in primary care, some clinical situations warrant referral to experts for diagnosis and/or management (1). The panel members agreed that in PHC, patients with severe asthma are appropriately referred to SHC and that severe asthma is appropriately evaluated. However, they also thought that many patients with non-severe asthma are treated in SHC when they could be treated in PHC, which may imply a misuse of resources. The indications for referral may vary, as there is substantial variation between health systems in the delivery of the majority of asthma care (1). From the results of the questionnaire, we conclude that clear consensus criteria must be determined between PHC and SHC to decide when an asthmatic patient should be referred to another level of care. In that sense, the respondents reached consensus on 10 of the proposed criteria by the scientific committee. Some of them match the guideline criteria of GEMA (16) and 2008 British Thoracic Society (BTS) (18), such as the cases of severe persistent asthma or poorly controlled asthma. However, some of the indications for referral in GINA reports were not included (1).

In relation to the communication between PHC and SHC regarding patients with severe asthma, respondents generally agreed that it is weak and in need of improvement, and that a strong PHC-SHC relationship improves the quality of care provided to patients with asthma. The need for greater coordination between PHC and SHC is also evident in studies conducted in neighboring countries (6). There is evidence that asthma management programs, including better coordination between PHC and SHC, greater availability of resources and better training for PHC physicians are associated with better care services provided to asthmatic patients, thereby reducing long-term cost (19).

Strengths and limitations

The limitations of this consensus study are those specific to a modified Delphi consensus, because this technique is not free of possible influences from its promoters. However, efforts were made to strictly confine these limitations to the maximum: the study sponsors were not involved and did not influence the development of the questions, the analysis or the interpretation of the results, nor were they involved in the drafting or editing process of the final document. As the surveys were anonymously completed, without the influence of the other panel members, it was possible to obtain a more reliable, broader and diverse collection of opinions.

Finally, far from posing a problem with regard to reaching an agreement, the participation of different types of specialists (family medicine, pulmonology and allergology) enriched the evaluation by including different points of view. The final consensus items show the majority opinion of the three specialties involved in the management of this disease. The results may be biased due to the snowball recruitment strategy since the sample might include an over-representation of individuals with similar characteristics. However, it facilitated us to form the expert panel.

Implications for research and/or practice

Directions for future research may include undertaking a more in-depth analysis of the impact of the physician-patient relationship and of the patient's expectations and perceptions that may influence the degree of asthma diagnosis and management (20). It would also be useful to incorporate views of nurses or patients in further research. After the barriers and possible solutions are identified, the next step is to apply changes in clinical practice and evaluate the results.

In conclusion, this consensus study among different specialists involved in the management of severe asthma aims to inform strategies for reducing the underdiagnosis of asthma, simplifying existing guidelines and questionnaires to facilitate their use in clinical practice, applying criteria for referral and improving communication between PHC and SHC.

Supplementary material

Supplementary material is available at *Family Practice* online.

Declaration

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- 1 **Supplemental-Table 1.** Results of block 1 of the questionnaire: Severe asthma management in
 2 adults in PHC.

	First Round		Second Round		Result
	Median (IQR)	Degree of agreement *	Median (IQR)	Degree of agreement *	
1. The concept of severe asthma is not clearly defined in the GEMA guidelines.	3 (2-5)	58.54%	3 (2-5)	70.59%	Consensus disagreement reached in the second round
2. The concept of severe asthma is not clearly defined in the GINA guidelines.	3 (2-5)	53.66%	3 (2-5)	67.65%	Consensus disagreement reached in the second round
3. PHC physicians know the concept of asthma severity determined in the GEMA guidelines.	5 (3-5)	39.02%	3 (3-5)	52.94%	Non-consensus
4. PHC physicians know the concept of asthma severity determined in the GINA guidelines.	5 (3-5)	34.15%	4 (3-5)	32.35%	Non-consensus
5. Time constraints hinder the implementation of guidelines such as GEMA or GINA.	8(7-8.5)	78.05	---	---	Agreement reached in the first round
6. In PHC, severe asthma is often confused with poorly controlled	7 (6-8)	68.29%	---	---	Agreement reached in the first

asthma.					round
7. In general, asthma is appropriately diagnosed in PHC.	5 (4-7)	46.34%	5 (4-7)	50%	Non-consensus
8. In general, severe asthma is appropriately diagnosed in PHC.	5 (3-7)	51.22%	6 (3-7)	41.18%	Non-consensus
9. Spirometry is a test available in most primary care centers.	7 (7-8)	65.85%	7 (7-8)	76.47%	Agreement reached in the second round
10. In PHC, severe asthma may be confused with other diseases such as COPD, heart disease and bronchiectasis.	7 (6-8)	60.98%	7 (6-8)	67.65%	Agreement reached in the second round
11. It is common for PHC physicians to determine the severity of asthma before starting treatment of asthmatic patients.	6 (3-6)	41.46%	5 (3-6)	52.94%	Non-consensus
12. PHC physicians regularly assess the severity of asthma.	4 (3-5)	39.02%	4 (3-5)	44.12%	Non-consensus
13. In asthmatic patients being treated, PHC physicians determine the severity of asthma according to the minimal requirements of maintenance therapy to achieve control, as recommended in the GEMA guidelines.	5 (4-7)	46.34%	6 (4-7)	47.06%	Non-consensus

14. PHC physicians periodically assess the degree of asthma control in asthmatic patients.	5 (3-6)	29.27%	4 (3-6)	32.35%	Non-consensus
15. In clinical practice, questionnaires such as the Asthma Control Test (ACT) and the Asthma Control Questionnaire (ACQ) are rarely used in PHC to assess the degree of asthma control.	8 (7-9)	85.37%	---	---	Agreement reached in the first round
16. Only health record questionnaires are typically used to assess the degree of asthma control in PHC.	7(5.5-8)	68.29%	---	---	Agreement reached in the first round
17. The use of questionnaires such as the ACT or ACQ can save time during consultation when assessing the degree of control in asthmatic patients.	7 (6-8)	63.41%	7 (6-8)	55.88%	Non-consensus
18. It would be useful to incorporate questionnaires for asthma control into PHC computer-based searches.	8 (8-9)	92.68%	---	---	Agreement reached in the first round
19. It would be useful to incorporate guidelines on asthma management into PHC computer-based searches.	8 (7-9)	87.80%	---	---	Agreement reached in the first round
20. In their health records, patients often report better disease control than what ACT or ACQ questionnaires reflect.	7 (6.5-8)	75.61%	---	---	Agreement reached in the first round

21. Allergy screening tests with tools such as Phadiatop® must be available in PHC.	6 (3-7)	29.27%	5 (3-7)	32.35%	Non-consensus
22. In general, there is underdiagnosis of asthma in adults in PHC.	7 (6-8)	70.73	---	---	Agreement reached in the first round
23. In general, there is underdiagnosis of severe asthma in adults in PHC.	7 (6-8)	65.85%	7 (6-8)	67.65%	Agreement reached in the second round
24. Recommendations on asthma management of guidelines such as GEMA or GINA are known in PHC.	6 (4-7)	43.90%	6 (4-7)	47.06%	Non-consensus
25. Recommendations on asthma management of guidelines such as GEMA or GINA are followed in PHC.	6 (4-6)	56.1%	6 (4-6)	55.88%	Non-consensus

3 Spanish Guidelines on the Management of Asthma (GEMA)¹⁶ or Global Strategy for Asthma
4 Management and Prevention (GINA) guidelines¹

5

6 **Supplemental- Table 2.** Results of block 2 of the questionnaire: Interconsultation on severe asthma
7 in adults between PHC and pulmonary or allergy specialists.

8

	First Round		Second round		Result
	Median (IQR)	Degree of agreement *	Median (IQR)	Degree of agreement *	

26. In PHC, patients with severe asthma are appropriately referred to SHC.	7 (7-7)	60.98%	7 (7-7)	79.41%	Agreement reached in the second round
27. In SHC, severe asthma is appropriately evaluated.	7 (6-8)	68.29%	---	---	Agreement reached in the first round
28. Severe asthmatic patients are often treated in PHC and referred late to SHC.	7 (5-8)	51.22%	7 (5-8)	61.76%	Non-consensus
29. Many patients with severe asthma in PHC can continue to be attended in PHC exclusively, without being referred to SHC.	5 (2-5)	31.71%	3 (2-5)	55.88%	Non-consensus
30. Clear consensus criteria must be determined between PHC and SHC to decide when a patient with asthma must be referred from PHC to SHC.	9 (8-9)	100%	---	---	Agreement reached in the first round
31. Clear consensus criteria must be determined between PHC and SHC to decide when a patient with asthma must be referred from SHC to PHC.	9 (8-9)	100%	---	---	Agreement reached in the first round
32. Many patients with severe asthma are treated in SHC without it being necessary.	7 (7-8)	63.41%	7 (7-8)	76.47%	Agreement reached in the second round
33. The reasons for referring	3 (3-6)	60.98%	3 (3-6)	64.71%	Non-

patients from PHC to SHC should depend on the clinical judgment of a PHC physician and not on established criteria.					consensus
34. All asthmatic patients attended in PHC, regardless of asthma severity, must go at least once to SHC for evaluation.	5 (2-8)	26.83%	4.5 (2-8)	17.65%	Non-consensus
35. A patient referred to SHC for severe asthma, once controlled, must always be treated and followed up by SHC.	3 (2-4)	53.66%	3 (2-4)	64.71%	Non-consensus
36. A patient referred to SHC for mild asthma must always be treated and followed up by SHC.	1 (1-3)	80.49%	---	---	Consensus disagreement in first round
37. PHC physicians know what low, medium, and high doses of inhaled corticosteroids are to determine which treatment step the patient is assigned to.	7 (5-8)	53.66%	6.5 (5-8)	50%	Non-consensus
Asthmatic patients must be referred from PHC to SHC:					
38. When the patient has had an asthma attack that required going to emergency services or hospitalization.	7 (5-8)	58.54%	7 (5-8)	52.94%	Non-consensus
39. When treatments are required whose prescription falls	9 (7.5-9)	87.80%	---	---	Agreement reached in

within the purview of SHC, such as omalizumab.					the first round
40. When there is no response despite an appropriate treatment.	9 (8-9)	97.56%	---	---	Agreement reached in the first round
41. When high doses of inhaled corticosteroids are required.	8 (6-9)	70.73%	---	---	Agreement reached in the first round
42. To confirm a diagnosis of asthma.	7 (5-8)	53.66%	6 (5-8)	32.35%	Non-consensus
43. When the frequency of exacerbations increases, although they are not severe.	7 (6-8)	73.17%	---	---	Agreement reached in the first round
44. When a specific trigger is suspected (NSAIDs, allergens, etc.).	8 (6.5-9)	75.61%	---	---	Agreement reached in the first round
45. When immunotherapy is required.	9 (8-9)	97.56%	---	---	Agreement reached in the first round
46. In cases of mild persistent asthma according to the GEMA severity classification of asthma in adults.	4 (2-6)	31.71%	3 (2-6)	58.82%	Non-consensus
47. In cases of moderate persistent asthma according to the GEMA severity	6 (4-7)	51.22%	7 (4-7)	55.88%	Non-consensus

classification of asthma in adults.					
48. In cases of severe persistent asthma according to the GEMA severity classification of asthma in adults.	8 (8-9)	95.12%	---	---	Agreement reached in the first round
49. In cases of partly controlled asthma according to the GEMA severity classification of asthma in adults.	6 (5-8)	46.34%	6 (5-8)	47.06%	Non-consensus
50. In cases of poorly controlled asthma according to the GEMA severity classification of asthma in adults.	8 (7-9)	90.24%	---	---	Agreement reached in the first round
51. In patients at step 4 of the therapeutic stepwise approach to treatment in the maintenance therapy of asthma in adults (in which the treatment of choice is medium-dose inhaled corticosteroid + long-acting beta-2 adrenergic agonist).	6 (6-7)	50%	6.5 (6-7)	50%	Non-consensus
52. In patients at step 5 of the therapeutic stepwise approach to treatment in the maintenance therapy of asthma in adults (in which the treatments of choice are high-dose inhaled corticosteroid + long-acting beta-2 adrenergic	7 (7-9)	58.54%	8 (7-9)	88.24%	Agreement reached in the second round

agonist).					
53. All patients with difficult-to-control asthma (asthmatic patients whose disease is characterized by insufficient or poor control, despite an appropriate therapeutic strategy, adjusted to the level of clinical severity).	9 (8-9)	97.56%	---	---	Agreement reached in the first round

- 11 **Supplemental- Table 3.** Results of block 3: Opportunities for improving communication between
 12 PHC and SHC regarding patients with severe asthma.

		First Round		Second Round		Result
		Median (IQR)	Degree of agreement *	Median (IQR)	Degree of agreement *	
54. The relationship between PHC and SHC is weak regarding care services for asthmatic patients.		7 (6-8)	63.41%	7 (6-8)	67.65%	Agreement reached in the second round
55. It is necessary to improve the relationship between PHC and SHC regarding care services for asthmatic patients.		9 (8-9)	95.12%	---	---	Agreement reached in the first round
56. A close relationship between PHC and SHC improves the quality of care services for asthmatic patients.		9 (8-9)	97.56%	---	---	Agreement reached in the first round
	It is necessary to implement the following measures to improve the relationship between PHC and SHC as regards care services for asthmatic patients:					
57. Granting access to a shared health record.		9 (8-9)	97.56%	---	---	Agreement reached in the first round
58. Fostering meetings and joint clinical sessions.		9 (8-9)	97.56%	---	---	Agreement reached in the first round
59. Providing a contact telephone		9 (8-9)	90.24%	---	---	Agreement

number or pager with which PHC physicians can contact SHC physicians for specific consultations.					reached in the first round
60. Providing an email address at which PHC physicians can make specific consultations with SHC physicians.	9 (8-9)	95.12%	---	---	Agreement reached in the first round
61. Developing a joint asthma management plan between PHC and SHC.	9 (8-9)	97.56%	---	---	Agreement reached in the first round
62. Enabling online consultations from PHC to SHC physicians.	8 (8-9)	95.12%	---	---	Agreement reached in the first round
63. Adapting locally to the national guidelines.	8 (7-9)	82.93%	---	---	Agreement reached in the first round
64. Establishing a system of rapid access to SHC (outpatient consultation or hospital).	9 (8-9)	100%	---	---	Agreement reached in the first round