Explaining the amount and consistency of medical care and self-management support in asthma: a survey of primary care providers in France and the United Kingdom

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Running Title**:**

Asthma care in France and the United Kingdom

Potential conflicts of interest

During the past five years, Eric Van Ganse has received funds for research, participations to congresses and consulting from: ALK-ABELLO, BIF, MSD, ASTRA-ZENECA, CHIESI. During the past five years, Eric Van Ganse has been the main investigator of studies sponsored by GSK, MSD, CHIESI, PFIZER. The other authors have no conflict of interest to declare.

Abstract

Background: The quality of asthma primary care may vary between countries, health care practices, and health care professionals (HCPs). Identifying and explaining such differences is critical for health services improvement.

Objectives: To examine the quality of asthma primary care in France and United Kingdom, and identify within-country and between-country predictors amenable to intervention.

Methods: An online questionnaire to capture asthma medical care and self-management support, practice characteristics, and psychosocial determinants, was completed by 276 HCPs. Mokken Scaling analyses were used to examine item structure and consistency. Hierarchical regression analyses were used to identify predictors of the amount (number of asthma care activities HCPs delivered) and consistency (the degree to which HCPs deliver similar care) of asthma medical care and self-management support.

Results: On average, HCPs reported delivering 74,2% of guideline-recommended care. Consistency of medical care and self-management support was lower among HCPs delivering a lower amount of care ($r=.58$ and $r=.57$, $p<.001$). UK HCPs provided more and more consistent asthma self-management support –but not medical care- than French HCPs, which was explained by the presence of practice nurses in the UK. More training, positive social norms, and higher behavioural control explained better quality of care across all HCPs.

Conclusions: Using carefully-developed questionnaires and advanced psychometric analyses, this study suggests that involving practice nurses, making social expectations visible, and providing more training to enhance skills and confidence in asthma care delivery could enhance the amount and consistency of asthma primary care. This needs to be corroborated in a future intervention trial.

Keywords: asthma; quality of care; adherence; self-management; primary care; implementation; guidelines

Abbreviations: Health Care Providers (HCPs), United Kingdom (UK), Theory of Planned Behaviour (TPB), Mokken Scaling Analyses (MSA), Quality Outcomes Framework (QOF)

Highlights

1. What is already known about this topic?

Previous research suggests that there may be variation in the content of asthma care delivered in primary care, between and within-countries.

2. What does this article add to our knowledge?

This study reveals that the amount and consistency of asthma care varies substantially between primary care providers in the UK and France, and identifies important modifiable predictors of suboptimal care delivery

3. How does this study impact current management guidelines?

Involving nurses in asthma care, making patient expectations visible, and providing more training to enhance skills and confidence in asthma care delivery, could imrpove the quality of asthma medical care and self-management support.

BACKGROUND

Asthma continues to represent a global public health problem, affecting more than 300 million people worldwide (1,2). Uncontrolled asthma remains prevalent, with high costs for individuals and society (3,4). To support patients in achieving and maintaining asthma control, asthma care guidelines recommend health care professionals (HCPs) in primary care to deliver medical and self-management support (5–7). For these guidelines to benefit patients, they need to be widely adopted (8). Studies suggest that asthma care delivery is suboptimal (9–19), but research on this topic is still incipient. Most available studies have focused on a limited set of guideline-recommended activities and measured guideline implementation indirectly (e.g., through HCP knowledge tests or vignettes with hypothetical scenarios). No prior investigation focused on how much (the amount) of the guideline-recommended activities were routinely delivered to patients, explored whether different HCPs deliver similar asthma care (the consistency of care), or identified factors that explain differences in the quality of asthma care provided. To progress, we need to examine both the amount and consistency of asthma care using a comprehensive set of questions that capture medical care and self-management support directly (i.e., measure HCP behaviour rather than guideline knowledge), and identify the main quality of care determinants that can be targeted in future service improvement interventions.

Within a European Commission-funded asthma cohort study in the United Kingdom (UK) and France (20), we aimed to investigate the amount, consistency, and determinants of asthma care in primary care. The two different health care systems also provided an opportunity for between-country comparisons and reflecting on system-level influences on the quality of asthma care provided. Since 2004, UK primary care is guided by a performance management framework called the Quality and Outcomes Framework (QOF), which includes performance pay for several guideline-recommended asthma care activities. Some studies suggest that QOF resulted in improved performance on incentivised indicators of quality of care (21,22). The French health care system is similar to the UK system as it provides universal cover through a combination of public and private hospital and ambulatory care (23), however historically it has been more focused on hospital-based and specialist care (24). A pay-for-performance system to meet several prevention, prescription and chronic disease management goals was introduced in France in 2008, but with limited success (24). These system-level differences would be

expected to result in differences in how asthma care is delivered in primary care. In particular, the expectation could be that asthma primary care in the UK is more comprehensive and consistent than in France.

The current study examined and compared the amount and consistency of medical care and self-management support provided to asthma patients in primary care in the UK and France, and aimed to identify determinants that can explain variations in care within and between countries.

METHODS

Study design and participants

HCPs participating in patient recruitment for the ASTRO-LAB cohort in France and the UK (maximum 4 HCPs per practice) were invited via email to complete an online survey on their asthma care practices. No additional selection criteria were used. Thus, the sample size was determined by the number of HCPs in the cohort willing to participate. The study design, including ethics approvals, is detailed elsewhere (20).

Measures

The survey included questions on routine provision of medical care and self-management support to patients with persistent asthma who were prescribed (at least) daily use of an inhaled corticosteroid (ICS). We also collected data on HCP and practice characteristics, including HCP psychosocial determinants of providing asthma care.

Asthma care activities

To identify core medical care and self-management support activities for asthma management in primary care, we reviewed the literature on asthma care measurement and recent guidelines (5–7). We identified two questionnaires (17,18, 19, 25). As self-management support, particularly medication adherence, was less detailed in these guidelines and tools, we adapted additional items from previous research assessing adherence support in routine clinical care in other conditions (26–28). The items identified were formulated in English and back-translated to French. Cognitive (‘think-aloud’) interviews with 6 HCPs in both countries were conducted to ensure relevance and comprehensibility. Following this process, we aimed to ensure a good coverage of asthma care activities relevant for achieving good clinical outcomes, which HCPs can relate to and report on with minimal response burden.

The checklist included 12 medical and 25 self-management support activities. The item content and sources are detailed in the Online Repository (Table E1). In line with research suggesting that self-reports of behaviour are more accurate amongst people performing a behaviour routinely (most or all of the time) (29), we asked HCPs whether during the last 12 months they performed that activity with the majority of their patients on daily preventer therapy. The response options were 'Yes', 'No', and 'I don't know' (recoded to 'No' for analysis). Previous meta-analyses in another topic area (HIV care) demonstrated high reliability and strong predictive validity of this approach (26,27). To further increase validity and limit social desirability, the survey was anonymous and reassured respondents in an introductory statement that its purpose was not to verify HCP's knowledge, but to understand their daily practice and personal perspectives.

HCP and practice characteristics

Additional survey questions measured practice characteristics, socio-demographics, and professional background. We also assessed psychosocial determinants of care delivery based on the Theory of Planned Behaviour (TPB), which has been extensively used to explain patient and HCP behaviours (30,31). TPB states that in order to perform a behaviour people need to value performance of the behaviour positively (attitude), perceive that other significant people perform or expect them to perform the behaviour (subjective norms), and feel confident in their ability to perform the behaviour (perceived behavioural control), and consequently have a strong intention to act accordingly (behavioural intention). To limit respondent burden, TPB questions were only formulated only for self-management support. We used a 7-point Likert response scale and included 24 attitude, subjective norm, and perceived behavioural control items (see Table 1 for example items).

INSERT Table 1 ABOUT HERE

Analysis

Data analyses were conducted using R (32). Between-country differences were explored using Fisher's exact tests for binary, Wilcoxon rank-sum tests for ordinal, and t-tests for continuous variables; comparisons referring to individual asthma care delivery activities were Holm-adjusted for multiple testing.

The amount of medical care and self-management support were computed as total number of care activities reported. To examine consistency of care *at the country level*, we first performed Moken Scaling Analyses (MSA; (33)) per country, using items with sufficient variability (i.e., endorsed by 5%-95% of HCPs). MSA is a non-parametric item response theory methodology commonly used to examine psychometric properties of item sets developed to measure unidimensional constructs and differing in levels of difficulty (frequencies of endorsement in a given sample). Items and scales are evaluated in terms of homogeneity, monotonicity, local independence, and invariant item ordering; items that meet these criteria are considered appropriate for calculating global scores which reflect differences between respondents on a latent ordinal construct (34). Scale dimensionality was tested against a homogeneity threshold of H=.30. An exploratory item selection algorithm (aisp) was performed at increasing homogeneity thresholds to identify unidimensional scales (35). Monotonicity and invariant ordering assumptions were examined to identify item subsets that reflect how consistent asthma care is in each country. Consistency of care *at the individual HCP level* was operationalized as number of Guttman errors (G estimates), a person-fit indicator in MSA that reflects how consistent individual HCP response patterns are with the sample-characteristic response pattern (higher scores reflect lower consistency) (36,37).

To examine which factors explain the amount and consistency of care, four hierarchical regression analyses were conducted with asthma care sum scores (amount) and G estimates (consistency) of medical care and self-management support as dependent variables. The regression analyses included 3 models: 1) country, 2) practice characteristics, 3) individual characteristics, including psychosocial determinants for self-management support only. To allow for the analysis of both the effect of country and of profession (i.e., in the UK, nurses – not only GPs – also deliver asthma care), a dummy variable distinguishing French GPs from UK HCPs was included in Model 1 (test for country differences), and Model 2 included a dummy variable for 'UK nurse' (to compare UK GPs, with UK nurses and French GPs). We ran the analyses including all predictors variables, and once using a more parsimonious model that included only practice and individual HCP characteristics that showed at least weak bivariate associations with the dependent variables (Pearson's r $p \leq .10$; correlations in Table E2). Results were essentially identical and the full models is reported here.

The dataset used for these analyses can be found at osf.io/wk8vm.

RESULTS

Sample characteristics

A total of 276 HCPs completed the survey between November 2013 and January 2016: 156 (56.5%, all GPs) in France and 120 (43.5%; 68 GPs and 52 practice nurses) in the UK. UK practices were larger, with 15.8% (UK) and 62.8% (France) working in a practice with 1-3 GPs, and 40.9% (UK) versus 0.6% (France) in practices with >6 GPs. Only UK practices also employed nurses (100%), health care assistants (67.5%), and pharmacists (24.2%). UK HCPs had consultations with asthma patients more often than French HCPs (85.8% versus 39.7% saw at least one asthma patient every week). French HCPs performed asthma review consultations every 3 months (57.7%) or 6 months (28.8%), which lasted 15 (41.03%) or 20 (46.1%) minutes. UK HCPs saw patients less frequently (30.0% at 6 months and 60.8% at 12 months), and consultations were shorter for GPs (88.3% had 10 minutes) and similar for nurses (26.7% had 15 and 54.2% 20 minutes). Except for 2 French HCPs, all respondents had peak flow meters available in the practice. UK practices were however better equipped than French GPs with spirometers (98.3% vs 24.4%), pulse oximeters (99.1% vs 59.6%), large volume spacers (93.3% vs 78.2%), and nebulizers (98.3% vs 9.6%). Use of guidelines for asthma management was reported by 66% of French HCPs (GINA, HAS, or SFP) versus 98.3% UK HCPs (NICE, BTS/SIGN, or local guidelines, e.g., from Clinical Commissioning Groups). Common socio-demographics and professional background characteristics are presented in Table 2. There were no differences between France and the UK in attitudes and perceived behavioural control regarding self-management support, while subjective norms were more favourable in the UK (Table 2).

INSERT Table 2 ABOUT HERE

Amount of asthma care delivered

The percentages of French and UK HCPs reporting delivering individual medical care and self-management support activities, and the mean (SD) amount of care delivered per country, are presented

in Tables 3 and 4. There were significant differences between France and the UK on 2 medical care and 10 self-management support activities. The items that stand out are the much higher rates of allergy testing in France, and the much higher rates of using validated asthma control questionnaires in the UK.

Of all HCPs, 5.8% delivered all medical care activities, and 8.3% all self-management support activities On average, 27.4 of the 37 asthma care activities (74,2%) were delivered routinely, and only 1.8% HCPs delivered all activities. The amount of care was similar in both countries for medical care ($t(239.29)=1.38$, $p=.17$), while asthma self-management support scores were higher in the UK ($t(250.3)=4.85$, $p<.001$). Note that 'I don't know' responses (recoded to 'No' for analysis) were only given in only 1.4% of the answers.

INSERT Table 3 ABOUT HERE

INSERT Table 4 ABOUT HERE

Consistency of asthma care at country level

Medical care

Ten activities could be included in the Mokken scaling analysis (two items endorsed by >95% were removed). In France, activities were unrelated (scale H(SE)=.13(.03), item H(SE)=.04 (.05) -.19 (.14)). In the UK, 5 of 10 medical care activities formed a unidimensional scale (scale H(SE)=.55(.08), item H(SE)= .43 (.15) -.84 (.10), $\alpha = .62$ [95% CI=.47-.78]) showing latent monotonicity and invariant item ordering. Hence, French HCPs were likely to deliver different combinations of medical care activities (even when delivering the same amount of care), while in the UK half of the activities constituted a shared or consistent approach.

Self-management support

In France, 2 of 25 activities endorsed by >95% of respondents were excluded; the remaining 23 items showed low homogeneity (scale H(SE)= .23(.03), item H(SE)= .08(.05) -.35(.07)). Exploratory aisp suggested a 9-item homogenous scale demonstrating latent monotonicity and invariant item ordering. In the UK, out of the 20 items endorsed by <95%, 17 formed a unidimensional scale (H(SE)= .41(.05), item

H= .30(.09) -.57(.09)) showing latent monotonicity and invariant item ordering. Hence, in France 11 of 25 activities, while in the UK 22 of 25 activities formed coherent approaches. Aisp analyses are detailed in Tables E3-E6 in the Online Repository.

Consistency of care at HCP level: Number of Guttman errors

When comparing individual HCP responses to response patterns common to the whole sample, the consistency of care was similar in both countries for medical care (t(229.65)=1.938, p=.05; mean=3.87 and 4.70 in France and the UK), while self-management support was less consistent in France (t(246.9)=3.056, p=.003; mean=20.55 and 15.53 in France and the UK).

Associations between the amount and consistency of care

HCPs wo delivered more medical care also delivered more self-management support (r=.54; p<.001). Moreover, HCPs who delivered medical care that was more consistent with that of other HCPs, also delivered self-management support that was more consistent with their peers (r=.18; p=.003). Finally, HCPs who delivered more medical care and self-management support, delivered this care more consistently (r=.58 and .57 respectively; p<.001). Hence, scores for both components of care and of quality of care converged: care delivery is much more variable between different HCPs who are already delivering less of the guideline-recommened care (and vice versa).

Multivariate analyses explaining asthma care delivery

Medical care

In Model 1, country did not explain the amount of medical care (Table 5). Model 2 revealed that both UK nurses and French GPs delivered more medical care than the UK GPs. Model 3 showed that HCPs trained in asthma care during their university studies delivered more guideline-compatible medical care.

French GPs delivered more consistent medical care (Table 5, Model 1), but this effect became non-significant when practice and individual characteristics were added in Models 2 and 3. No significant effects on consistency of medical care were identified.

INSERT Table 5 ABOUT HERE

Self-management support

Country did predict the amount of self-management support, with French GPs providing less support than UK HCPs (Table 6). Model 2 suggested that this effect was explained by the availability of nurses in the UK. In Model 3 asthma-specific training (ongoing professional development), patient education training (university studies), subjective norms ('do others expect me to deliver this?'), and perceived behavioural control ('am I able to deliver this?') explained the amount of self-management support provided.

UK HCPs delivered more consistent self-management support than French GPs (Table 6, Model 1). This effect seemed entirely explained by the presence of nurses in the UK (Model 2). In Model 3, subjective norms also explained consistency of self-management support.

Model diagnostics revealed one influential case in 3 of the models, but removal did not influence the results reported here. Given the finding that nurses play such an important role in asthma care delivery in the UK, Table E7 in the Online Repository provides the descriptives for UK GPs and Nurses separately.

INSERT Table 6 ABOUT HERE

DISCUSSION

Using carefully developed tools, advanced psychometric methods, and data from two countries, this study is – to our knowledge – the first to examine and demonstrate that the amount *and* consistency of asthma care provided in France and the UK are highly variable. Importantly, the consistency in the care delivered was low especially for medical care and amongst HCPs already delivering fewer of the guideline-recommended asthma care activities. We were also able to identify country, system, and individual HCP differences explaining variability in asthma care in multivariate models. The hypothesis that country predicts the amount and consistency of care, was only confirmed for self-management support. Another key finding was that UK nurses tended to deliver more asthma care and in a more consistent manner, than GPs (also illustrated in Figures 1 and 2); but our analysis did not provide an explanation for that. Finally, HCPs degree of training in medical care and patient education, and more positive subjective

norms (i.e., ‘do others expect me to deliver this?’) and perceptions of control (i.e., ‘am I able to deliver this?’), explained variability in asthma care. Hence, recommendations for policy and practice would be to involve practice nurses in French primary care, making patient expectations and best practice examples visible to HCPs (subjective norms), and expanding HCP training both in asthma and patient education to enhance knowledge, skills and confidence (perceived behavioural control) in delivering high-quality asthma care.

INSERT Figure 1 ABOUT HERE

INSERT Figure 2 ABOUT HERE

HCPs were on average able to deliver 75% of the activities recommended in guidelines, but only 1.8% was able to deliver all. This may reflect previously-reported difficulties in applying guidelines in routine practice (16). Regarding the consistency of care, we could not find any other quality of care studies that examined this characteristic of care delivery; yet a shared approach to care between different HCPs reflects the success of guideline implementation and could be a valuable indicator for guideline developers.The consistency analyses we developed in this study revealed considerable differences between the theoretical structure of asthma care (what should be delivered) and its real structure (how HCPs deliver care). In practice, this means patients are likely to receive different care if they would visit different HCPs, even if these provide exactly the same amount of care. Hence, it could be useful for future quality of care research to include measures of both the amount and consistency of care. Our findings also suggest that interventions to improve the quality of care likely require changes at the policy, management, and HCP level. Therefore, future studies on the quality of asthma care should explore system, practice, and individual HCP level determinants of asthma care.

This study has several strengths and limitations. It utilised a carefully-designed, comprehensive questionnaire to assess both medical care and self-management support in two countries. Other studies on quality of asthma care provided an excellent starting point for this study, but typically focused on a narrower selection of guideline components (9,10,13–16). Moreover, we used these data to examine the

amount *and* consistency of care provided, which to our knowledge is a novel approach relevant to evaluating quality of care in a population of HCPs. Finally, we examined what factors amenable to intervention explain both the amount and consistency of care, identifying avenues for improving both components. Collecting data in two countries also allowed for cross-country comparisons. A possible limitation is that socially desirable responses may have led to an overestimation of the care delivered. On the other hand, recall difficulties could have led to an underestimation of care provided, since the response option 'I don't know' [whether I routinely deliver this care to my asthma patients] was recoded to 'No' (although only 1.4% of the responses was 'I don't know'). With only 1.8% reporting delivering all activities, ceiling effects were not observed. Moreover, the strong correlation between the amount and consistency of care can be interpreted as evidence of convergent validity, and the significant variance in the amount and consistency of care predicted by other variables also suggests a valid assessment. Second, the determinants investigated in this study explained a limited amount of variance, particularly in medical care. Further work could explore what other system, practice, and individual level determinants are relevant here. Third, although the participating HCPs formed a sufficiently large and heterogeneous sample for the analyses conducted, they might not be fully representative of UK and French primary care professionals. Fourth, this study was embedded in a larger cohort study on the safety and effectiveness of LABAs. The sample size of this study was not defined a-priori, but determined by the number of practices in this cohort and the response rates of the participating practices.

CONCLUSION

In this study we developed a new questionnaire to capture asthma medical care and self-management support, which showed good psychometric properties. IRT analyses allowed us to examine both the amount and consistency of asthma care – two relevant but conceptually different quality of care dimensions. Our findings suggest that changes in resources (i.e., involving nurse practitioners in asthma care delivery), more asthma-specific and patient education training for HCPs, and providing normative feedback to individual HCPs could enhance the quality of asthma care in the UK and France. This needs to be corroborated in a future intervention trial.

DECLARATIONS

Ethics approval and consent to participate

The study received ethics approval in the UK from the NRES Committee London – West London (REC reference 12/LO/2039, protocol number 282593, IRAS project ID 112186). In France, it received the approval of the CCTIRS for observational studies in health (Advisory Committee for Data Processing in Health Research, reference number 12.702) and of the CNIL (National Commission on Informatics and Liberty, EGY/FLR/AR134392) regarding data privacy.

Consent for publication

Not applicable

Availability of data and material

The research consortium is currently discussing the exact conditions of data sharing. The details of where the data and materials are accessible will be available by the time of publication (would the article be accepted).

Competing interests

During the past five years, Eric Van Ganse has received funds for research, participations to congresses and consulting from: ALK-ABELLO, BIF, MSD, ASTRA-ZENECA, CHIESI. During the past five years, Eric Van Ganse has been the main investigator of studies sponsored by GSK, MSD, CHIESI, PFIZER. The other authors have no conflict of interest to declare.

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Authors' contributions

MdB, NT, and EvG obtained project funding. MdB, AD, and EvG designed and developed the materials for this substudy. AD and NT managed data collection. AD and MdB conducted the statistical analyses and drafted the manuscript. NT and EvG critically revised the manuscript.

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Figure captions

Figure 1. The association between (a) the *consistency* and (b) the amount of Self-management support (y-axis) and Medical care (x-axis). Higher scores on Guttman errors reflect lower consistency of care. Higher scores on number of activities performed reflect a higher amount of care provided. Different symbols are used for the different HCPs and the lines reflect 95% confidence intervals per HCP. HCPs reporting more consistent Self-management support also report delivering more consistent Medical care; and the same holds for amount of care provided.

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Figure 1 provided in separate file

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Figure 2. The association between the amount (y-axis) and consistency (x-axis) of (a) Self-management support and (b) Medical care. Different symbols are used for the different HCPs and the lines reflect 95% confidence intervals per HCP. The negative associations suggest that HCPs delivering a higher number of guideline-based care activities also provide more consistent care (lower scores on Guttman errors). Nurses report delivering more and more consistent medical care and self-management support than GPs.

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Figure 2 provided in separate file

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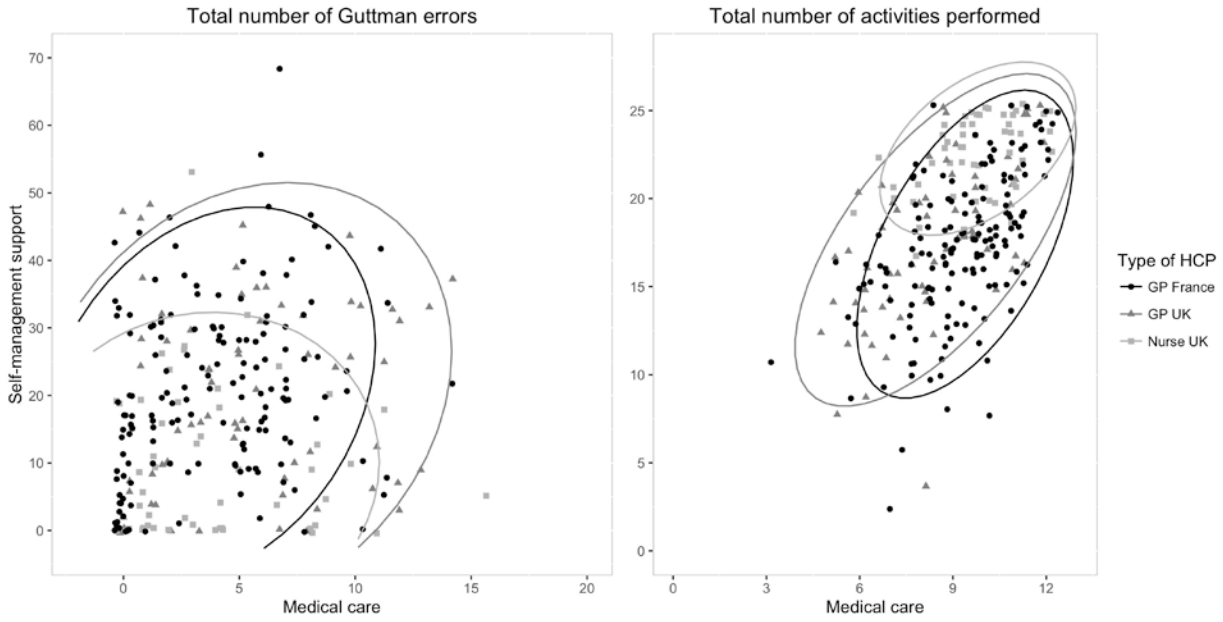

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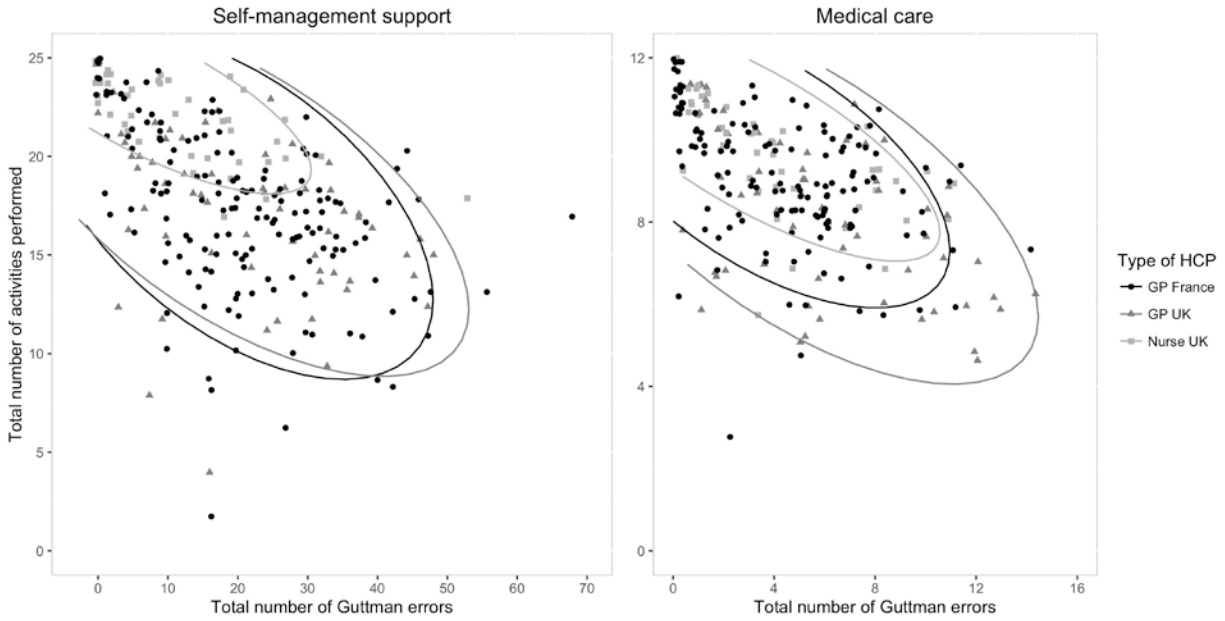
Self-management support
Medical care
Total number of activities performed
Total number of Guttman errors
Total number of Guttman errors
Type of HCP
GP France
GP UK
Nurse UK

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523 **Table 1. Psychosocial determinants of self-management support**

Determinant	Example content	No. items	Cronbach's α	M (SD)		t-test (df)	p-value
				France	UK		
Attitude	"I think that, overall, self-management support is: totally my responsibility … not at all my responsibility"	8	.85	5.41 (0.84)	5.55 (0.88)	1.329 (250.64)	.185
Subjective norms	"Most of my patients expect me to provide self-management support: strongly agree … strongly disagree"	6	.87	4.71 (1.01)	5.4 (1.18)	5.096 (233.53)	<.001
Perceived behavioural control	"I am confident that I can provide self-management support when I have limited time with the patient: strongly agree … strongly disagree"	10	.93	4.15 (1.1)	4.55 (1.42)	2.533 (217.61)	.012

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Table 2. Sample characteristics - descriptive statistics

Characteristic	France (n=156)	UK (n=120)	p-value
Gender (women)	53 (33.97%)	71 (59.2%)	<0.001
Use of guidelines (yes)	103 (66.0%)	118 (98.3%)	<0.001
Age			
Less than 30 years	0 (0%)	3 (2.5%)	
30 to 39 years	26 (16.67%)	26 (21.7%)	
40 to 49 years	42 (26.92%)	39 (32.5%)	0.088
50 to 59 years	73 (46.79%)	45 (37.5%)	
60 years and over	15 (9.62%)	7 (5.8%)	
Years of experience in asthma care			
Less than 5 years	10 (6.41%)	15 (12.5%)	
5 to 9 years	21 (13.46%)	20 (16.7%)	
10 to 19 years	45 (28.85%)	42 (35.0%)	0.044
20 to 29 years	55 (35.26%)	35 (29.2%)	
30 years and over	25 (16.03%)	8 (6.7%)	
Asthma-specific training			
During university studies	110 (70.5%)	106 (88.3%)	<0.001
Ongoing professional development (e.g., workshops or conferences)	94 (60.3%)	98 (81.7%)	<0.001
Patient education training			
During university studies	58 (37.2%)	91 (75.8%)	<0.001
Ongoing professional development (e.g., workshops or conferences)	115 (73.7%)	89 (74.2%)	1

Note: group comparisons performed with Fisher's exact test for binary, Wilcoxon rank-sum test for ordinal, and t-tests for continuous variables.

Table 3. Frequencies of reporting medical care activities and significance tests for between-country differences (ordered from most to least frequent in France)

Medical care activity	Number (%) HCPs reporting routine delivery		P-value	P-value (Holm)
	France (n=156)	UK (n=120)		
Assess smoking status for patients over 13 years old	154 (98.72%)	118 (98.33%)	1.000	1.000
Step-up treatment if patients have poor asthma control	152 (97.44%)	119 (99.17%)	.392	1.000
Question patients to identify asthma triggers	148 (94.87%)	107 (89.17%)	.108	.972
Refer to an asthma specialist if poor asthma control	144 (92.31%)	99 (82.50%)	.015	.150
Perform or refer to repeated lung function tests - over 8 years old	136 (87.18%)	102 (85.00%)	.603	1.000
Discuss how to avoid or manage triggers	120 (76.92%)	102 (85.00%)	.125	.972
Perform or refer to allergy testing	118 (75.64%)	12 (10.00%)	<.001	<.001
Assess comorbid conditions and prescribe treatment if needed	118 (75.64%)	81 (67.50%)	.139	.972
Delay stepping-up treatment when poor adherence or inhaler use	116 (74.36%)	98 (81.67%)	.190	.972
Assess smoking status of co-inhabitants (parents, partner, roommate)	115 (73.72%)	77 (64.17%)	.113	.972
Ask patients whether they have been able to manage triggers	95 (60.90%)	69 (57.50%)	.621	1.000
Use a validated set of questions to assess symptoms	30 (19.23%)	93 (77.50%)	<.001	<.001
Mean (SD)	9.27 (1.63)	8.97(1.84)	.17	
Number of HCPs delivering all activities	10 (6.4%)	6 (5%)		

Note: group comparisons via Fisher's exact test with unadjusted and Holm-adjusted p-values

534 **Table 4. Frequencies of reporting adherence support activities and significance tests for**

535 **differences**

Adherence support activity	Number (%) HCPs reporting routine delivery		P-value	P-value (Holm)
	France (n=156)	UK(n=120)		
Explain the difference between preventer and reliever medication	154 (98.72%)	119 (99.17%)	1.000	1.000
Discuss what to do in case of worsening symptoms or an asthma attack	150 (96.15%)	118 (98.33%)	0.472	1.000
Discuss the importance of taking the inhaler medication as prescribed for achieving asthma control	146 (93.59%)	118 (98.33%)	0.074	0.740
Explain what their medication does to control asthma	145 (92.95%)	119 (99.17%)	0.015	0.168
Ask patients if they have any concerns about using their inhaler medication as prescribed	140 (89.74%)	92 (76.67%)	0.004	0.060
If patients report adherence difficulties, discuss what can be done to overcome these	139 (89.10%)	113 (94.17%)	0.196	1.000
Ask patients whether they have always taken their inhaler medication as prescribed since their last visit	133 (85.26%)	105 (87.50%)	0.725	1.000
Explain what happens to the lungs during an asthma attack	126 (80.77%)	99 (82.50%)	0.756	1.000
Discuss the risks of not taking inhaler medication regularly or stopping treatment	123 (78.85%)	108 (90.00%)	0.014	0.168
Plan storing spare asthma inhalers at strategic places (office, car, school)	123 (78.85%)	75 (62.50%)	0.003	0.048
Ask patients with poor asthma control to come more frequently to the clinic	123 (78.85%)	116 (96.67%)	<0.001	<0.001
Discuss with patients which inhaler device they prefer to use	115 (73.72%)	83 (69.17%)	0.421	1.000
Inquire about side-effects and discuss how these can be managed if present	115 (73.72%)	86 (71.67%)	0.785	1.000
Encourage patients who you perceive as having good adherence	112 (71.79%)	107 (89.17%)	<0.001	<0.001
Ask patients to show how they use their inhaler	111 (71.15%)	104 (86.67%)	0.002	0.034
Explain common side-effects and how to deal with them	100 (64.10%)	103 (85.83%)	<0.001	<0.001
Practice how to use inhalers	99 (63.46%)	101 (84.17%)	<0.001	<0.001
Explain the difference between asthmatic and normal	91	99	<0.001	<0.001

airways	(58.33%)	(82.50%)		
Ask patients how confident they feel in their ability to take the inhaler medication as advised	87 (55.77%)	75 (62.50%)	0.270	1.000
Discuss common barriers to taking inhaler medication as prescribed (adherence), and how to deal with these	83 (53.21%)	69 (57.50%)	0.542	1.000
Together with the patients discuss an individualized plan of where, when and how to take their medication	82 (52.56%)	91 (75.83%)	<0.001	<0.001
Discuss with patients how they can monitor their asthma control using symptom diaries or a peak flow meter	61 (39.10%)	97 (80.83%)	<0.001	<0.001
Ask patients to identify daily routines (e.g. brushing teeth) to remember to use inhaler medication at these times	50 (32.05%)	74 (61.67%)	<0.001	<0.001
Develop with patients a written action plan detailing medication intake instructions that they can follow at home	44 (28.21%)	52 (43.33%)	0.011	0.143
Encourage patients to use reminders (e.g. an alarm) to remember their inhaler medication use	32 (20.51%)	43 (35.83%)	0.006	0.084
Mean (SD)	17.21 (4.16)	19.72 (4.34)	<.001	
Number of HCPs delivering all activities	5 (3.2%)	18 (15%)		

Note: group comparisons via Fisher's exact test with unadjusted and Holm-adjusted p-values

Table 5. Hierarchical regression analyses for the amount and consistency of medical care (unstandardized estimates and standard errors)

	Amount			Consistency		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	8.975***	8.249***	6.681***	11.300***	11.191***	9.399***
	(0.157)	(0.488)	(0.661)	(0.323)	(1.015)	(1.401)
Country (FR)	0.294	0.719	0.975*	0.854*	-0.016	-0.244
	(0.209)	(0.381)	(0.400)	(0.430)	(0.792)	(0.848)
Specialty (nurse)		1.188**	1.030*		1.022	0.156
		(0.371)	(0.432)		(0.772)	(0.915)
Caseload (high)		0.243	0.306		-0.450	-0.304
		(0.233)	(0.235)		(0.486)	(0.497)
Frequency consultations		-0.021	-0.008		-0.116	-0.118
		(0.030)	(0.030)		(0.063)	(0.064)
Minutes consultation		0.016	0.008		0.088	0.077
		(0.027)	(0.028)		(0.057)	(0.059)
Gender (female)			0.053			0.687
			(0.249)			(0.527)
Age (groups)			0.308			0.727
			(0.188)			(0.398)
Years experience			-0.138			-0.194
			(0.159)			(0.337)
Asthma in University studies			0.869***			0.343
			(0.253)			(0.536)
Asthma ongoing professional development			0.213			-0.301
			(0.242)			(0.513)
R^2	0.007	0.074	0.126	0.014	0.056	0.076
Adjusted R^2	0.004	0.057	0.093	0.011	0.039	0.041

*p<.05, **p<.01, ***p<.001. Note: More Guttman errors reflect less consistent care; this variable was reversed here to reflect consistency (rather than inconsistency).

Table 6. Hierarchical regression analyses for the amount and consistency of self-management support (unstandardized estimates and standard errors)

	Amount			Consistency		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	19.717***	16.377***	4.933*	53.467***	48.878***	27.143***
	(0.387)	(1.137)	(1.977)	(1.222)	(3.781)	(7.054)
Country (FR)	-2.512***	-0.743	0.906	-5.012**	0.492	1.961
	(0.515)	(0.888)	(0.901)	(1.625)	(2.952)	(3.215)
Specialty (nurse)		4.395***	4.124***		10.717***	9.746**
		(0.866)	(0.980)		(2.877)	(3.498)
Caseload(high)		0.788	0.601		2.188	1.763
		(0.544)	(0.505)		(1.809)	(1.801)
Frequency consultations		-0.026	0.041		-0.085	0.021
		(0.070)	(0.065)		(0.234)	(0.231)
Minutes consultation		0.075	0.062		-0.080	-0.045
		(0.064)	(0.060)		(0.213)	(0.214)
Gender(female)			-0.826			-1.679
			(0.535)			(1.907)
Age (groups)			0.194			0.439
			(0.404)			(1.442)
Years experience			-0.089			0.965
			(0.341)			(1.219)
Asthma in University studies			0.703			-0.288
			(0.564)			(2.013)
Asthma ongoing professional development			0.803			-2.528
			(0.534)			(1.905)
Communication undergrad or postgrad training			1.228*			2.052
			(0.519)			(1.852)
Communication ongoing professional development			1.042*			2.734
			(0.526)			(1.878)
Attitudes			0.183			-0.642
			(0.356)			(1.270)
Subjective norms			0.937**			2.664**
			(0.282)			(1.005)
Perceived behavioral control			0.504*			1.227
			(0.218)			(0.777)
R^2	0.080	0.227	0.400	0.034	0.100	0.191

Adjusted R^2	0.077	0.213	0.365	0.030	0.083	0.144

*p<.05, **p<.01, ***p<.001. Note: More Guttman errors reflect less consistent care; this variable was reversed here to reflect consistency (rather than inconsistency)