

# Primary care physician perceptions on the diagnosis and management of chronic obstructive pulmonary disease in diverse regions of the world

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**Abstract:** Chronic obstructive pulmonary disease (COPD) is a multicomponent disorder that leads to substantial disability, impaired quality of life, and increased mortality. Although the majority of COPD patients are first diagnosed and treated in primary care practices, there is comparatively little information on the management of COPD patients in primary care. A web-based pilot survey was conducted to evaluate the primary care physician's, or general practitioner's (GP's), knowledge, understanding, and management of COPD in twelve territories across the Asia-Pacific region, Africa, eastern Europe, and Latin America, using a 10-minute questionnaire comprising 20 questions and translated into the native language of each participating territory. The questionnaire was administered to a total of 600 GPs (50 from each territory) involved in the management of COPD patients and all data were collated and analyzed by an independent health care research consultant. This survey demonstrated that the GPs' understanding of COPD was variable across the territories, with large numbers of GPs having very limited knowledge of COPD and its management. A consistent finding across all territories was the underutilization of spirometry (median 26%; range 10%–48%) and reliance on X-rays (median 14%; range 5%–22%) for COPD diagnosis, whereas overuse of blood tests (unspecified) was particularly high in Russia and South Africa. Similarly, there was considerable underrecognition of the importance of exacerbation history as an important factor of COPD and its initial management in most territories (median 4%; range 0%–22%). Management of COPD was well below guideline-recommended levels in most of the regions investigated. The findings of this survey suggest there is a need for more ongoing education and information, specifically directed towards GPs outside of Europe and North America, and that global COPD guidelines appear to have limited reach and application in most of the areas studied.

**Keywords:** COPD, questionnaire, survey, guidelines

## Introduction

Chronic obstructive pulmonary disease (COPD) is an important multicomponent chronic lung disorder that causes substantial disability, significantly impairs the health-related quality of life, and increases the risk of death in individuals with moderate to severe airway obstruction.<sup>1–8</sup> Epidemiologic evidence suggests that prevalence of COPD ranges from 4% to 20% in adults over 40 years of age, with latest estimates from the World Health Organization indicating about 210 million people being affected worldwide.<sup>4</sup> However, it is likely that this number is underestimated as a consequence of differences in diagnostic criteria employed and because the disease is often not diagnosed or is misdiagnosed in the early stages.<sup>4,5</sup> There is a considerable difference in the prevalence of COPD between low- to middle-income and high-income countries.<sup>4</sup>

The Global Initiative for Chronic Obstructive Lung Disease (GOLD)<sup>5</sup> suggests that although COPD is not a curable disease, it is nevertheless preventable and treatable. However, a constraint in optimal management of COPD patients is that the majority of COPD patients are usually first seen and treated by primary care physicians, who may or may not, for a variety of reasons, diagnose or treat patients appropriately.<sup>9,10</sup> Indeed, despite the availability of international<sup>5,7,11</sup> and national clinical guidelines for the management of COPD,<sup>12–15</sup> the disease commonly remains undiagnosed,<sup>15,16</sup> or is diagnosed only at an advanced stage when the clinical symptoms become apparent and the disease is associated with substantial end-organ damage.<sup>16–18</sup> Furthermore, once COPD is diagnosed, it is often undertreated or is treated inappropriately.<sup>16,19,20</sup> Misdiagnosis of COPD is also quite common,<sup>20–22</sup> with up to 25% of patients over 40 years old with COPD being labeled as having asthma<sup>21,22</sup> and, conversely, about 7% of patients with asthma being labeled as having COPD.<sup>20</sup> Moreover, many patients identified as COPD patients using the *COPD International Classification of Diseases, 9th Revision, Clinical Modification* diagnostic codes do not have airflow obstruction when they undergo spirometry.<sup>23</sup>

Information available to date on the management of COPD patients in primary care is limited and mostly comes from Western countries with established national and/or regional management programs for COPD. In view of these findings, the authors undertook a study to survey general practitioners (GPs) in non-European Union/non-US territories across the Asia-Pacific region, Africa, eastern Europe, and Latin America in order to understand how GPs approached COPD diagnosis and treatment in these regions.

## Methods

A group of physicians from Argentina, Australia, Brazil, China, Hong Kong, Japan, Mexico, Russia, South Africa, South Korea, Taiwan, and Turkey who were experts in the field of chronic respiratory diseases was assembled in March 2010, through an unrestricted grant from GlaxoSmithKline. This group was provided with a broad-based brief to explore the management of COPD patients by GPs in their respective territories. Following initial group discussions, it became clear that there was a common perception that poor management, including late diagnosis and inappropriate treatment of COPD patients, was a major problem globally. Moreover, this appeared to be driven predominantly by the clinical practice of GPs; however, there were little data to confirm this observation.

To test this hypothesis, a pilot survey was conducted to evaluate the GPs' knowledge, understanding, and management of COPD, irrespective of the number of years of their experience as practicing physicians, in each of the twelve territories represented by the members of the expert group. A short and easy-to-administer questionnaire (Appendix 1) comprising 20 questions was developed by informative discussion and general consensus among members of the expert group. Prior to finalization, the members of the expert group translated the questionnaire into the native languages of their respective territories, and these translated questionnaires were then validated by piloting among small groups of GPs and professional physicians in the respective territories. The final translated and validated questionnaires were then administered in the different territories as a web-based survey.

Synovate Healthcare, London, UK (an independent health care research consultancy firm specializing in such surveys) recruited participants from a panel of self-registered GPs from different regions across each of the twelve territories, creating and managing the panel between 2006 and 2011. All participants responded to a request to participate in the study and all were nominally compensated for their time, with a payment of between £14 and £44, depending on territory.

A total of 813 questionnaire surveys were conducted, of which the first 50 fully completed questionnaires for each territory were selected, and the remaining questionnaires excluded from the final analysis (109 incomplete questionnaires and 104 fully completed questionnaires after the quota was reached). A total of 600 responses from GPs were included in this analysis. The sample size was determined based on advice from Synovate Healthcare, who indicated that, based on experience of such studies,  $n = 30/\text{territory}$  was enough to get a "signal," and thus  $n = 50/\text{territory}$  would be appropriate for the study.

Data from all participants were collated in a dedicated database, which was also set up and managed by Synovate Healthcare.

## Results

Table 1 shows the demographics of the GP participants. Assessment of age distribution indicated that Mexico and Russia had the youngest GPs; for example, 92% of GPs in Mexico were under 40 years of age. In contrast, Argentina (52%) and Australia (46%) had the highest numbers of GPs over 50 years of age, with 2% of GPs from Argentina being older than 70 years. Similarly, 6% of GPs from Hong Kong were older than 70 years. The majority of GPs surveyed were male (overall mean of 73%), with Japan and South Korea

Table 1 Demographics of the study sample

Variable	Argentina	Australia	Brazil	China	Hong Kong	Japan	Mexico	Russia	South Africa	South Korea	Taiwan	Turkey
GPs in age range (%)												
21–30 years	0	16	18	2	0	76	42	0	2	2	0	14
31–40 years	30	40	46	38	34	16	36	36	24	24	24	42
41–50 years	18	24	28	32	30	4	8	54	48	48	52	40
51–60 years	36	18	8	10	36	4	14	10	22	22	18	0
61–70 years	14	2	0	12	0	0	0	0	4	4	6	2
>70 years	2	0	0	6	0	0	0	0	0	0	0	0
Gender (male, %)	70	74	40	88	96	64	44	66	94	94	86	84
Years in practice (mean)	23.3	22.5	15.8	19.8	19.3	5.7	11.4	14.9	12.6	12.6	17.2	13.6
GPs in practice (%)												
<5 years	2	10	8	2	0	60	14	0	20	20	0	14
5–15 years	32	26	50	42	34	32	60	66	48	48	42	44
16–25 years	20	40	28	30	42	6	18	30	24	24	44	38
26–30 years	24	18	10	12	20	2	4	4	6	6	12	2
>30 years	22	16	4	14	4	0	4	0	2	2	2	2
Patients seen per month												
Total (mean)	351	662	380	1090	346	202	292	429	1247	1247	836	756
With COPD (%)	12	10	20	8	17	18	17	15	7	7	6	12

Abbreviations: COPD, chronic obstructive pulmonary disease; GP, general practitioner.

having almost completely male GP practices. However, females comprised the majority of the GPs in China and Russia. Although the overall mean number of years in practice for the sample was 15.9 years, assessment by territory indicated that the mean number of years in practice was directly correlated with the age of the GPs. Thus, the GPs from Mexico were the least experienced (mean of 5.7 years) and the GPs from Argentina (mean of 23.3 years) and Australia (mean of 22.5 years) were the most experienced.

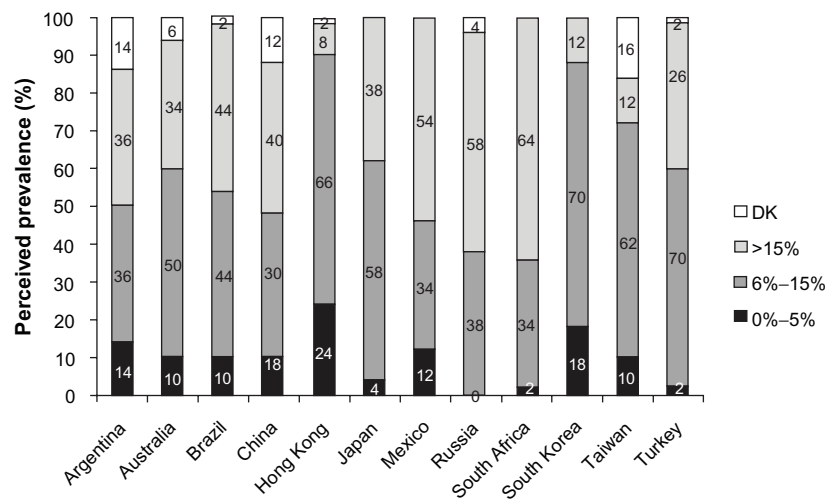
## Understanding of prevalence and risk factors

The GPs' understanding of the prevalence of and risk factors associated with COPD was assessed according to their responses to questions 7 and 8, respectively, from the survey questionnaire (Appendix 1). While a mean of 35.5% of the GPs (range 8%–64%) surveyed reported a prevalence rate of over 15% in their country, a mean of 10.3% of the GPs (range 0%–24%) reported a prevalence rate below 5% (Figure 1). Moreover, relatively large numbers of GPs from Argentina (14%), China (12%), and Taiwan (16%) did not have any idea of the prevalence of COPD in their respective territories.

Assessment of the GPs' knowledge of the major risk factors associated with COPD showed that although the majority of the GPs (94%) rated smoking to be the top risk factor, 38% of GPs surveyed also rated asthma to be the next most important risk factor across all territories. Interestingly, although many clinicians regard hereditary factors as being important, only 9% of the GPs also considered this to be the case. Furthermore, 6% of GPs also considered tuberculosis to be an important risk factor for COPD.

## Diagnosis

The GPs' practices for diagnosis of COPD were assessed according to their responses to Question 12 from the survey questionnaire (Appendix 1). Symptoms and spirometry were the most frequently reported routine tools used to diagnose subjects with COPD (mean of 56.5% of first or second mentions for symptoms, with a range of from 26% [South Africa] to 76% [Argentina/Hong Kong]; mean of 52.8% of first or second mentions for spirometry, with a range of from 18% [Turkey] to 84% [Australia]) (Table 2). Interestingly, GPs from South Africa tended to underreport the use of symptoms and spirometry (26% of first and second mentions for symptoms and 20% of first and second mentions for spirometry) and overreport the use of blood tests (50% of first and second mentions) as routine diagnostic tools for COPD, compared with their peers from other territories (Table 2).



**Figure 1** Perceived prevalence of chronic obstructive pulmonary disease (COPD) in each territory.<sup>a</sup>

**Notes:** <sup>a</sup>Results based on Question 7 from the COPD survey questionnaire: In your opinion, what is the prevalence of COPD in your country? (N = 600).

**Abbreviation:** DK, don't know.

However, when considering all mentions of routine tools, instead of only first and second mentions, the reported use of the chest X-ray became prominent in all territories and actually exceeded the reports for spirometry and/or symptoms in five of the twelve territories (Hong Kong, Mexico, Russia, South Africa, South Korea) surveyed (Table 2). Moreover, the survey demonstrated that the underutilization of spirometry in most territories was apparent despite the GPs having ready access to the technique (Table 3).

## Initiation and management of treatment

The GPs' practices for initiation and management of treatment for COPD were assessed according to their responses to questions 13 and 14, respectively, from the survey questionnaire (Appendix 1). Although symptoms and spirometry often guided the GPs' choice of initial treatment in the survey, there was underrecognition of the importance of exacerbation history as an important factor of COPD and its initial management in most countries (median 4%; range 0%–8%) apart from China (22%). Indeed, exacerbation history was not mentioned as one of the three most important factors in any territory other than Brazil and Taiwan. Similarly, exacerbation history was not even considered to be important for the ongoing management of patients by the majority of the physicians surveyed in four of the twelve territories, including China, Hong Kong, Japan, and South Africa (Figure 2).

## Reference to guidelines

The GPs' practices for use of COPD guidelines were assessed according to their responses to questions 15–17 from the survey questionnaire (Appendix 1). Roughly two out of three

GPs in the sample reported that COPD guidelines informed their management practices (Figure 3). Physicians reported the use of a wide variety of guidelines, of which institutional and organizational guidelines were used more frequently than the GOLD guidelines.<sup>5</sup> Indeed, the GOLD guidelines<sup>5</sup> were not mentioned by the sample of GPs from China, South Africa, or Turkey, and the International Primary Care and Respiratory Group COPD management guidelines<sup>11</sup> were not mentioned at all.

While the GPs from Hong Kong and Turkey were less likely to be influenced by guidelines in the management of COPD, overall non-guideline-informed management of COPD was reported to be either a consequence of nonavailability of the guidelines to large numbers of the GPs surveyed in most of the territories or because the GPs considered the guidelines to be too long or not relevant (Figure 3).

## Discussion

The generally accepted global prevalence for COPD in adults aged 40 years and over ranges between 7% and 15%, according to the population-based BOLD, PLATINO, and Asia-Pacific studies.<sup>24–27</sup> This survey has demonstrated that the GPs involved in the survey tended to overestimate prevalence figures, despite a general consensus that COPD is underdiagnosed and undertreated. While population-based surveys are an important tool to provide real estimates of prevalence, it is interesting to note that there still appears to be a wide variation of awareness of these data at the GP level in territories such as Australia, Brazil, China, Hong Kong, Japan, South Africa, and Turkey, where population-based prevalence estimates have been conducted.<sup>24–27</sup>

**Table 2** Diagnosis of chronic obstructive pulmonary disease (COPD) by general practitioners (%) in different territories, based on symptoms, spirometry, chest X-ray, and blood test<sup>a</sup>

Territory	Symptoms			Spirometry			Chest X-ray			Blood test		
	First use	Second use	Other	First use	Second use	Not used	First use	Second use	Other	First use	Second use	Not used
Argentina	62	14	16	22	26	12	8	22	46	0	2	28
Australia	42	18	16	48	36	5	5	22	50	0	0	8
Brazil	50	8	12	34	24	0	12	34	28	0	0	22
China	32	18	28	40	16	6	14	14	54	0	4	50
Hong Kong	68	8	4	10	40	38	16	24	42	0	0	4
Japan	36	16	20	40	24	8	14	20	38	0	0	28
Mexico	44	10	10	34	20	24	12	40	30	0	0	26
Russia	46	4	24	22	34	4	22	22	52	10	14	54
South Africa	22	4	2	12	8	62	16	20	12	32	18	10
South Korea	30	20	8	40	26	24	22	32	28	4	2	14
Taiwan	50	12	16	26	34	8	16	34	40	4	0	20
Turkey	42	22	10	12	6	74	20	28	16	6	12	32

Note: <sup>a</sup>Results based on Question 12 from the COPD survey questionnaire: what do you routinely use to diagnose COPD in your practice? (N = 600).

**Table 3** Access to and use of spirometry as the first diagnostic tool for chronic obstructive pulmonary disease (COPD) in each territory

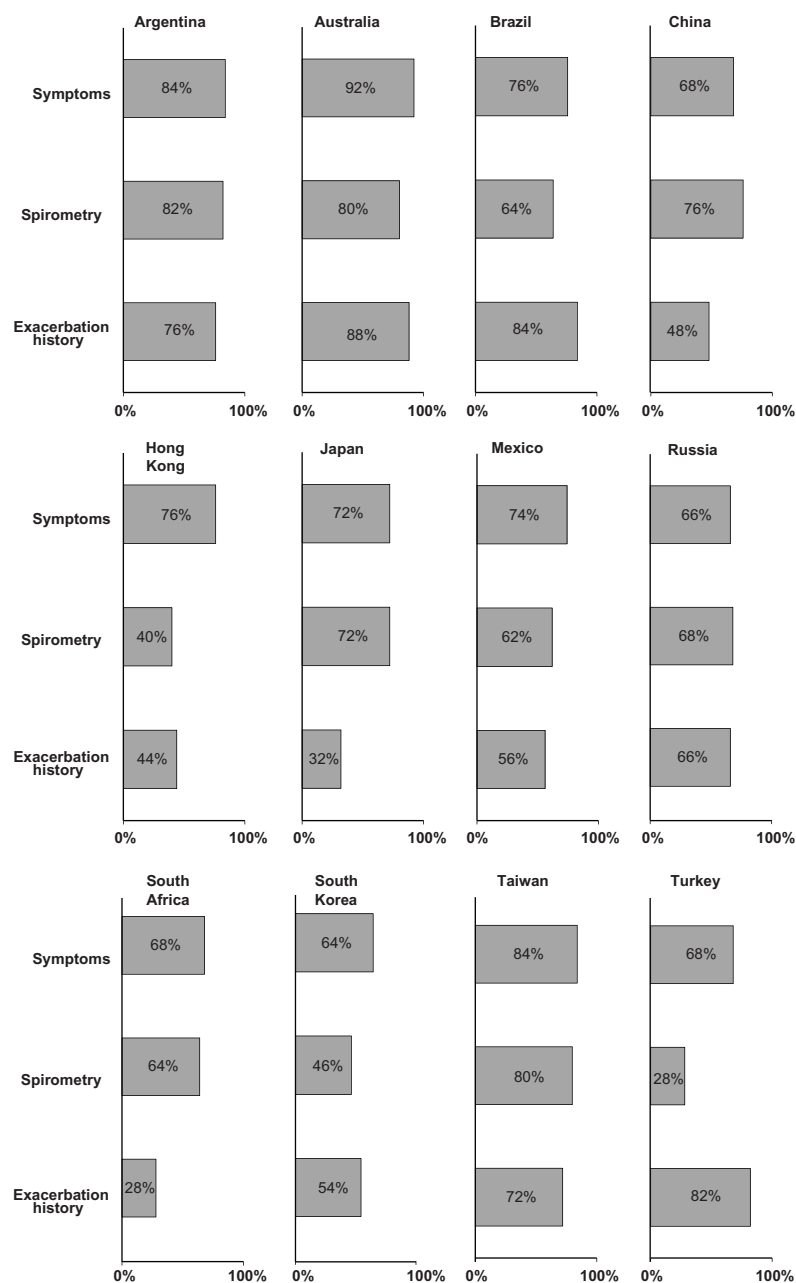
Territory	GP access to spirometry (%) <sup>a</sup>	GP use of spirometry as first diagnostic tool for COPD (%) <sup>b</sup>
Argentina	80	22
Australia	94	48
Brazil	92	34
China	64	40
Hong Kong	46	10
Japan	64	40
Mexico	42	34
Russia	96	22
South Africa	78	12
South Korea	60	40
Taiwan	86	26
Turkey	10	12

Notes: <sup>a</sup>Results based on Question 11 from the COPD survey questionnaire: in your practice, which of the following do you have easy access to? (N = 600); <sup>b</sup>results based on Question 12 from the COPD survey questionnaire: What do you routinely use to diagnose COPD in your practice? (N = 600).

Abbreviation: GP, general practitioner.

The GOLD guidelines suggest that symptoms, spirometry, and exacerbation history are the most important features of the assessment of COPD patients,<sup>5</sup> with spirometry particularly being advocated by international guidelines as a key aspect of diagnosis for COPD.<sup>5,11</sup> The use of spirometry as a routine diagnostic tool was mentioned frequently in the survey, yet much research suggests that spirometry is underutilized by GPs. It is unclear if survey respondents provided answers based on best practice rather than on the reality of care. In Turkey, where access to spirometry is limited by the health care system to specialty care, the sample did reflect this reality in the GPs' responses. The overall finding for low utilization of spirometry as a diagnostic tool for COPD in the survey is in accordance with the findings of two recent prospective cross-sectional studies that investigated practice patterns of primary care physicians with experience of managing COPD patients.<sup>16,28</sup> However, the authors of the present survey were surprised by the frequency of mentions of chest X-rays as diagnostic tools, with chest X-rays mentioned more than spirometry in some territories.

Although the authors know of no blood test currently available and recognized by the medical community for diagnosing COPD, the use of blood tests as a speculative answer to the question on routine diagnostic tools was included in the survey to determine the GPs' response. Interestingly, the survey demonstrated that in a large minority of the territories sampled, blood tests were indeed mentioned frequently,



**Figure 2** Ongoing treatment of chronic obstructive pulmonary disease (COPD) by general practitioners in different territories, based on symptoms, spirometry, and exacerbation history.<sup>2</sup>

**Note:** <sup>2</sup>Results based on Question 14 from the COPD survey questionnaire: in your practice, which of the following are important when deciding the ongoing treatment of a COPD patient? (N = 600).

with 50% or more of GPs using this as a diagnostic tool for COPD. Moreover, there appeared to be a negative correlation between the frequency of mention of blood tests and the frequency of mention of guideline-informed management of the disease, suggesting a gross deficiency in the COPD management practice of these GPs.

A history of exacerbations is a predictor of risk for future exacerbations, more rapid decline in lung function, poorer quality of life, and increased mortality.<sup>29,30</sup> In this

survey, a history of exacerbations was not cited in most territories as an important consideration for the initiation of treatment and was not considered as important by the majority of survey respondents in Japan, Hong Kong, and South Africa. It is possible that in the current absence of a universally accepted definition of COPD exacerbation,<sup>31–33</sup> most GPs did not fully understand what characterized an exacerbation of COPD and therefore did not give much importance to its history.

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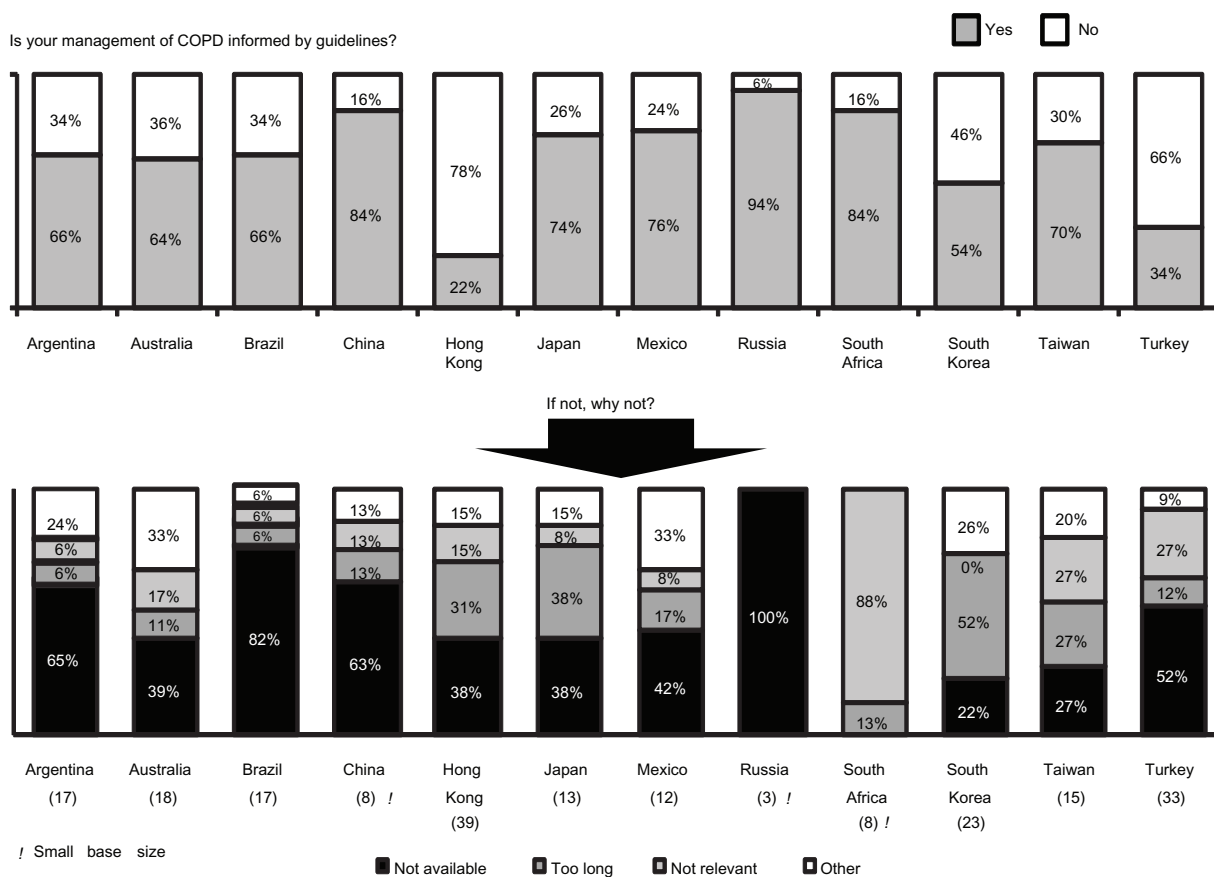


Figure 3 Percentage of general practitioners managing chronic obstructive pulmonary disease (COPD) patients according to guidelines.

### Limitations

This survey is limited in several respects. The sample size was relatively small and might not be representative of the general GP population in larger countries with diverse regional and/or cultural differences (eg, China and Russia). However, as far as the authors are aware, it provides the only data that address these issues within the regions, and therefore it forms an important reference base for further research. Participants were recruited from a select panel of registered GPs, using a web-based approach. It is possible that survey respondents provided answers based on best care rather than on the reality of their practice. However, despite the lack of rigorous sampling strategy, there is consistency in several aspects of this report, across all territories surveyed, and the data form the basis for further, more directed studies in a larger sample size in each territory.

### Conclusion

This survey was conducted in territories where the views and beliefs of GPs are not usually assessed in global surveys, and therefore the results reflect opinions of frontline physicians in a variety of situations. The findings of this survey suggest

that there appears to be a need for more ongoing education and information, specifically directed towards GPs outside of Europe and North America, and that global COPD guidelines appear to have limited reach and application in these areas. In particular, there appears to be a need to increase awareness of the importance and use of spirometry to confirm a COPD diagnosis and to increase awareness of exacerbations and their importance in managing COPD. Furthermore, there appears to be a need for both providing easier access to the guidelines and simplifying the guidelines, of which the latter should be done in consultation with GPs, in order that the guidelines are seen as being able to add value to their practice of managing COPD patients. The results of this survey clearly suggest that a larger prospective study of the beliefs and attitudes of GPs in non-Western countries is warranted to better establish the information on the practices/knowledge of GPs in those regions.

### Acknowledgment

The authors would like to thank GlaxoSmithKline for the financial support of the study and Dr Jagdish Devalia for assistance in the preparation and editing of this article.

## Disclosure

Richard D Walters and Gilbert Nadeau are employees of GlaxoSmithKline and also have shares in the company.

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## Appendix I: COPD survey questionnaire

Q1. Country of practice?

\_\_\_\_\_

Q2. Age (years)?

<20 (END SURVEY)

21–30

31–40

41–50

51–60

61–70

70+

Q3. Gender?

Male

Female

Q4. Years of practice? (Open question, limit to two characters)

\_\_\_\_\_

Q5. Number of patients you see a month? (Open question, limit to 999 as maximum)

\_\_\_\_\_

Q6. What percentage of the answer to Q5 are COPD (also referred to as emphysema or chronic bronchitis) patients? (PN: 0%–100%)

\_\_\_\_\_

Q7. In your opinion, what is the prevalence of COPD in your country?

0%–5%

6%–10%

11%–15%

16%–20%

21%–25%

26%–30%

31%–35%

36%–40%

41%–45%

46%–50%

>50%

Don't know

Q8. What are the three major risk factors associated with COPD in your country?

Aging

Asthma

Indoor air pollution

Occupational exposure

Outdoor air pollution

Hereditary

Tobacco smoke

Tuberculosis

Don't know

- Q9. In your opinion, what are the most common comorbid diseases associated with COPD? (Please give up to three answers.)
1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
- Q10. Do COPD exacerbations have any of the following long-term effects? (You may choose between one and five answers.)
- Increase rate of decline in lung-function
  - Increase rate of mortality
  - Increase risk of cancer
  - Weight gain
  - Worsening of quality of life
  - Don't know
- Q11. In your practice, which of the following do you have easy access to?
- Arterial blood gases
  - Blood test
  - Chest X-ray
  - CT scan
  - Spirometry
  - Oximetry
  - Other: \_\_\_\_\_
- Q12. What do you routinely use to diagnose COPD in your practice? (If you choose more than one option then rank in order of importance.) (PN: If respondent chooses more than one option then rank in order of importance.)
- Arterial blood gases
  - Blood test
  - Bronchodilator response
  - Chest X-ray
  - CT scan
  - Oximetry
  - Spirometry
  - Symptoms
  - Other: \_\_\_\_\_
- Q13. In your practice, please rank in order of importance which of the following you consider when deciding on the initial treatment of a COPD patient?
- Age
  - Chest X-ray
  - Comorbid diseases
  - CT scan
  - Environmental control including smoking cessation
  - Exacerbation history
  - Exercise limitation
  - Oximetry
  - Spirometry
  - Sputum examination
  - Symptoms

- Q14. In your practice, which of the following are important when deciding the ongoing treatment of a COPD patient?
- Age
  - Chest X-ray
  - Comorbid diseases
  - CT scan
  - Environmental control including smoking cessation
  - Exacerbation history
  - Exercise limitation
  - Oximetry
  - Spirometry
  - Sputum examination
  - Symptoms
- Q15. Is your management of COPD informed by any guidelines?
- Yes
  - No
- Q16. If yes, which guidelines do you follow?
- \_\_\_\_\_
- Q17. If no, why do you not follow COPD guidelines?
- Not available
  - Too long
  - Not relevant
  - Other: \_\_\_\_\_
- Q18. What are the reasons for you to refer a patient to a respiratory physician? (You may choose more than one answer.)
- Appropriate treatment can only be prescribed by respiratory physician
  - Patient has not responded to therapy
  - Patient requests it
  - Patient requires oxygen therapy
  - Patient requires rehabilitation
  - Patient requires special education
  - You are unsure about the diagnosis
  - Other: \_\_\_\_\_
- Q19. What proportion of your COPD patients cannot access the treatment you wish to prescribe them?
- None (END SURVEY)
  - 1%–25%
  - 26%–50%
  - 51%–75%
  - 76%–100%
  - Don't know (END SURVEY)
- Q20. If your answer is one of the numerical options (ie, 1%–25%, 26%–50%, 51%–75%, or 76%–100%), why do your COPD patients not have access to their treatment?
- Guidelines/regulations
  - Not on hospital/clinic formulary
  - Patient preference
  - Too expensive
  - Other: \_\_\_\_\_
- END OF SURVEY

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