

## Treatment of Chronic Obstructive Pulmonary Disease in 5 Latin American Cities: The PLATINO Study

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**OBJECTIVE:** PLATINO is a population-based study designed to determine the prevalence of chronic obstructive pulmonary disease (COPD) in São Paulo, Brazil; Mexico City, Mexico; Montevideo, Uruguay; Santiago de Chile, Chile; and Caracas, Venezuela. The objective of this portion of PLATINO was to describe preventive and pharmacological treatment of COPD patients and factors associated with such treatment.

**PATIENTS AND METHODS:** Eligible subjects completed a questionnaire and underwent postbronchodilator spirometry.

**RESULTS:** Of the total of 5529 individuals who answered items referring to treatment, 758 had COPD (ratio of postbronchodilator forced expiratory volume in 1 second to forced vital capacity of <0.7), and 86 of them had been previously diagnosed by a physician. Among all COPD patients, only half of smokers or former smokers had been advised to quit and 24.7% had received some type of respiratory medication. Only 13.5% had used inhaled corticosteroids, and those were the patients with the most severe disease. In the group of patients who had a prior medical diagnosis of COPD, 69% of the smokers or former smokers had been advised to quit by a physician and 75.6% had received respiratory medication in the preceding year: 43% reported having used inhaled medication and 36% had used bronchodilators. Rates of vaccination against influenza and the use of mucolytic drugs and inhalers varied from one health care facility to another. All drug prescriptions were based on previous spirometry.

**CONCLUSIONS:** Spirometry emerged not only as a diagnostic tool, but also as a factor associated with treatment, against a background of uneven use of available health care resources in these 5 Latin American cities.

**Key words:** *Chronic obstructive pulmonary disease (COPD). Population-based study. Preventive treatment. Respiratory medication.*

### Tratamiento de la EPOC en 5 ciudades de América Latina: estudio PLATINO

**OBJETIVO:** PLATINO es un estudio de base poblacional para medir la prevalencia de la enfermedad pulmonar obstructiva crónica (EPOC) en São Paulo (Brasil), Ciudad de México (México), Montevideo (Uruguay), Santiago de Chile (Chile) y Caracas (Venezuela). El objetivo ha sido describir el tratamiento preventivo y farmacológico en individuos con EPOC y los factores asociados al mismo.

**PACIENTES Y MÉTODOS:** Los sujetos elegibles completaron un cuestionario y realizaron una espirometría posbroncodilatador.

**RESULTADOS:** De un total de 5.529 individuos con datos autorreferidos sobre tratamiento, se identificó como afectados de EPOC (relación volumen espiratorio forzado en el primer segundo/capacidad vital forzada < 0,7 posbroncodilatador) a 758, de los que 86 tenían diagnóstico médico previo. Considerando la totalidad de los pacientes con EPOC, sólo la mitad de los fumadores o exfumadores había recibido consejo anti-tabáquico y el 24,7% recibió algún tipo de medicación respiratoria. El uso de esteroides inhalados alcanzó un 13,5% de los individuos más graves. En el grupo de EPOC con diagnóstico médico previo, el 69% de los fumadores o exfumadores había recibido consejo médico para dejar de fumar y el 75,6% medicación respiratoria en el último año, un 43% de ellos por vía inhalada y un 36% broncodilatadores. La cobertura de vacunación antigripal y el uso de mucolíticos e inhaladores fueron variables en los distintos centros. Todas las prescripciones terapéuticas se asociaron a espirometría previa.

**CONCLUSIONES:** La espirometría surge no sólo como una herramienta diagnóstica, sino como factor asociado al tratamiento, en un contexto dispar de utilización de los recursos disponibles en estas 5 ciudades de América Latina.

**Palabras clave:** *Enfermedad pulmonar obstructiva crónica (EPOC). Estudio poblacional. Tratamiento preventivo. Medicación respiratoria.*

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## Introduction

Chronic obstructive pulmonary disease (COPD) is progressive, preventable, treatable and highly prevalent in both the United States and Europe.<sup>1,2</sup> It is expected to be the third cause of death in developed countries by the year 2020.<sup>3</sup>

The PLATINO (Spanish abbreviation for Latin American Project for Investigation of Pulmonary Obstruction) study carried out in 5 Latin American cities reported a prevalence of airflow limitation according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criterion (ratio of forced expiratory volume in 1 second [FEV<sub>1</sub>] to forced vital capacity [FVC] of less than 0.70),<sup>4</sup> as measured by postbronchodilator spirometry that ranged from 7.8% to 19.7% in the population aged 40 years or older. The situation in developing countries is thus worrying and presents a new challenge for public health programs.

The considerable social, economic, and health care repercussions of COPD have led scientific societies to call on experts in the field to issue guidelines for the management of COPD patients in order to optimize resources for the diagnosis, monitoring, and treatment of the disease.<sup>5,6</sup> However, the level of compliance with these guidelines remains low, with wide variations from country to country.<sup>2,7,8</sup>

All the guidelines emphasize the importance of correct diagnosis based on symptoms and confirmed by spirometry. Among other treatment strategies, they recommend preventive treatment such as smoking cessation and annual vaccination against influenza,<sup>9,10</sup> as well as the use of bronchodilators, preferably inhaled, using a treatment scale based on symptoms and disease severity.<sup>5,6</sup>

The objective of the present study was to assess the use of treatment, particularly preventive treatment and respiratory medication, prescribed for patients with varying degrees of COPD severity in 5 Latin American cities and to evaluate the possible factors associated with such treatment prescription.

## Patients and Methods

PLATINO is a multicenter population-based cross sectional study designed to determine the prevalence of COPD in 5 Latin American cities: São Paulo, Brazil; Mexico City, Mexico; Montevideo, Uruguay; Santiago de Chile, Chile; and Caracas, Venezuela.<sup>4</sup>

Multistage cluster sampling was used to obtain a representative sample of patients aged 40 years or more from the metropolitan area of each city. Details of the selection method and size of the population sample have been previously published.<sup>11</sup> The study protocol was approved by the ethics committee of each of the centers—Universidad Federal de Pelotas and Universidad Federal de São Paulo in Brazil, Universidad Pontificia Católica de Chile, Instituto Nacional de Enfermedades Respiratorias de Mexico, Hospital Maciel Universidad de la República in Uruguay, and Universidad Central de Venezuela—and the participants gave signed informed consent.

The patients interviewed completed a questionnaire on symptoms and exposure to risk factors, with special emphasis on smoking history, and underwent pre- and postbronchodilator spirometry. The questionnaire, validated and standardized, was translated into Spanish and Portuguese.

For quality control of the study protocol, a shortened questionnaire was administered to 10% of the participants in each center no more than 2 weeks later, and very good agreement was observed in all the centers. The questionnaires are available on the Internet (<http://www.platino-alat.org>).

We obtained information retrospectively for the preceding 12 months on physicians' advice to quit smoking, vaccination against influenza, use of any medication to "help with breathing," type of medication, and frequency of use. We recorded the commercial name of each drug, which was then classified as "any bronchodilator," "corticosteroid," or "mucolytic syrup."

The spirometry tests, 1 at baseline and 1 at 15 minutes after the administration of 200 µg of salbutamol, were performed according to the criteria of acceptability and reproducibility (between 150 mL and 200 mL) accepted by various authors.<sup>12,13</sup> Exclusion criteria for spirometry have been detailed elsewhere.<sup>14</sup> Spirometry was performed using the Easy One NDD spirometer (Medical Technologies, Zurich, Switzerland) with ultrasonic sensor technology and reviewed daily. Calibration was verified with a 3-L syringe (Hans Rudolf Inc, Shawnee, Kansas, USA). Strict quality control procedures were followed in all centers with the participation of qualified technicians trained by the PLATINO team according to the recommendations of the National Institute for Occupational Safety and Health.

The diagnosis of COPD was made according to GOLD criteria (FEV<sub>1</sub>/FVC, <0.7). Prior medical diagnosis of COPD status was obtained from the information offered by the patients themselves regarding whether they had ever been told by any physician that they had emphysema, chronic bronchitis, or COPD. According to these diagnostic criteria, patients with COPD were subdivided into 2 groups—with or without a prior medical diagnosis of COPD—for analysis.

## Statistical Analysis

Quantitative variables are expressed as means (SD) and qualitative variables as percentages. The *t* test was used to analyze differences between means and the Pearson  $\chi^2$  test to compare qualitative variables. A logistic regression model was constructed to identify the variables associated with treatment according to diagnosis and severity of disease, as determined by spirometry. Statistical significance was set at a value of *P* less than .05.

The Stata software package version 9.0 (Stata Corporation, College Station, Texas, USA) was used for all analyses.

## Results

Of a total of 6711 eligible subjects in all the centers, 5571 questionnaires and 5315 spirometry tests were completed. Valid postbronchodilator spirometry results and information on treatment were available for 5229 participants. In this population, 758 patients with a postbronchodilator FEV<sub>1</sub>/FVC ratio of less than 0.7 were identified, 59.4% of whom were in stage I of the GOLD classification, 33.8% in stage II, 5.4% in stage III, and 1.5% in stage IV. As shown in Table 1, there were significant differences regarding sex, smoking history, and respiratory symptoms among the various COPD severity groups, while the mean age was similar in all of them.

The 86 (11.3%) of the 758 patients who had been previously diagnosed by a physician had significantly more respiratory symptoms, had undergone more spirometry tests, and had greater airflow limitation. These data have been published previously.<sup>15</sup>

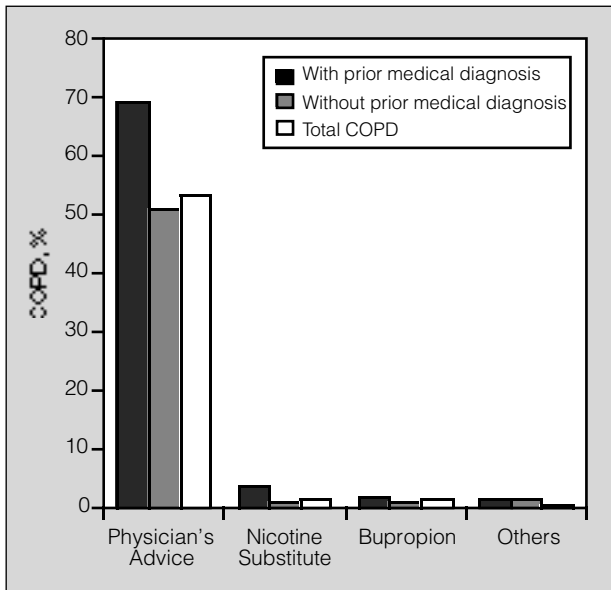


Figure 1. Smoking cessation treatment for smokers and former smokers with a ratio of forced expiratory volume in 1 second to forced vital capacity less than 0.7, according to whether or not a prior diagnosis had been made. COPD indicates chronic obstructive pulmonary disease.

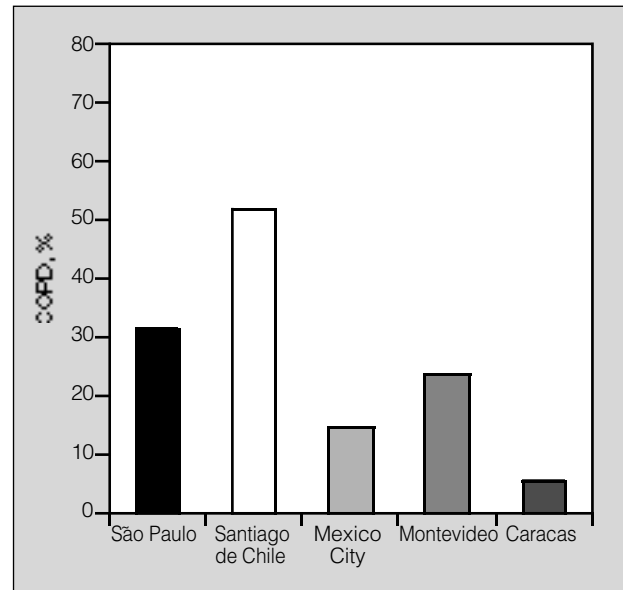


Figure 2. Vaccination against influenza in the preceding year in 758 patients with a ratio of forced expiratory volume in 1 second to forced vital capacity of less than 0.7, by participating health care facilities. COPD indicates chronic obstructive pulmonary disease.

Of all the patients with a diagnosis of COPD confirmed by spirometry, 519 (68.5%) were either smokers or former smokers. Figure 1 shows smoking cessation interventions in all COPD patients according to whether or not they had been previously diagnosed by a physician. In the total population with COPD, only half had ever been advised by a physician to quit smoking, while 69% of patients with a prior medical diagnosis had received such advice. Pharmacological or nonpharmacological treatment to assist smoking cessation was rarely prescribed, regardless of whether there had been a prior diagnosis of COPD or not. When patients from the 5 centers were classified by GOLD criteria of disease severity, likewise, there were no differences in the frequency of prescription of support.

Rates of prescription of vaccination against influenza varied considerably among the health care facilities, ranging from 5.1% in Caracas to 52% in Santiago de Chile (Figure 2).

Table 2 shows the use of respiratory medication in all COPD patients according to whether or not they had been previously diagnosed by a physician. Of the 758 patients with COPD, only 187 (24.7%) had received some type of respiratory medication in the preceding year, while three quarters (75.6%) of those with a prior medical diagnosis had. There was less use of any type of respiratory medication in patients who had not been previously diagnosed by a physician than in those who had.

The use of respiratory medication during the preceding year in COPD patients classified according to GOLD stages of severity is shown in Table 3. These results indicated an increase in the use of medications as disease severity progressed. Of the patients with the most severe disease (stages III and IV), 65.4% were receiving medication.

TABLE 1  
Patient Characteristics of the Population With COPD, According to Severity (GOLD Stage)<sup>a</sup>

| Variables            | GOLD Stages   |               |               |                          | Total (n=758) |
|----------------------|---------------|---------------|---------------|--------------------------|---------------|
|                      | I (n=450)     | II (n=256)    | III (n=41)    | IV (n=11)                |               |
| Mean (SD) age, y     | 65.23 (12.53) | 62.02 (11.65) | 65.08 (12.16) | 64.97 (11.60)            | 64.13 (12.28) |
| Male sex             | 243 (54.0%)   | 128 (50.0%)   | 16 (39.0%)    | 9 (81.8%) <sup>a</sup>   | 396 (52.2%)   |
| Current smoker       | 157 (34.9%)   | 101 (39.4%)   | 14 (34.1%)    | 1 (0.1%) <sup>a</sup>    | 273 (36.0%)   |
| Former smoker        | 135 (30.0%)   | 89 (34.8%)    | 16 (39.1%)    | 7 (63.6%) <sup>a</sup>   | 247 (32.6%)   |
| Nonsmoker            | 158 (35.1%)   | 66 (25.8%)    | 11 (26.8%)    | 3 (27.3%) <sup>a</sup>   | 238 (31.4%)   |
| Respiratory symptoms |               |               |               |                          |               |
| Cough                | 117 (26.0%)   | 92 (35.9%)    | 21 (51.2%)    | 7 (63.6%) <sup>a</sup>   | 237 (31.4%)   |
| Expectoration        | 103 (22.9%)   | 86 (33.6%)    | 20 (48.8%)    | 5 (45.5%) <sup>a</sup>   | 214 (28.2%)   |
| Wheezing             | 129 (28.7%)   | 130 (50.8%)   | 26 (63.4%)    | 9 (81.8%) <sup>a</sup>   | 294 (38.8%)   |
| Dyspnea              | 191 (42.4%)   | 145 (56.6%)   | 31 (75.6%)    | 11 (100.0%) <sup>a</sup> | 378 (49.8%)   |

Abbreviations: GOLD, Global Initiative for Chronic Obstructive Lung Disease; COPD, chronic obstructive lung disease.

<sup>a</sup>Data are shown as number of cases (percentage) or mean (SD).

<sup>b</sup>P<.001.

TABLE 2  
Pharmacological Treatment of COPD Patients With and Without a Prior Medical Diagnosis<sup>a</sup>

|                            | Prior Medical Diagnosis of COPD |                          | Total COPD  |
|----------------------------|---------------------------------|--------------------------|-------------|
|                            | Yes                             | No                       |             |
| Respiratory medication     |                                 |                          |             |
| In the preceding year      | 65 (75.6%)                      | 122 (18.2%) <sup>a</sup> | 187 (24.7%) |
| Presentation               |                                 |                          |             |
| Tablets 12 (14.0%)         | 27 (4.0%) <sup>a</sup>          | 39 (5.1%)                |             |
| Inhaled 37 (43.0%)         | 64 (9.5%) <sup>a</sup>          | 101 (13.3%)              |             |
| Nebulized 2 (2.3%)         | 6 (0.9%) <sup>a</sup>           | 8 (1.0%)                 |             |
| Syrups 9 (10.5%)           | 22 (3.3%) <sup>a</sup>          | 31 (4.1%)                |             |
| Type of medication         |                                 |                          |             |
| Any bronchodilator         | 31 (36.0%)                      | 54 (8.0%) <sup>a</sup>   | 85 (11.2%)  |
| Any inhaled corticosteroid | 10 (11.6%)                      | 8 (1.2%) <sup>a</sup>    | 18 (2.4%)   |
| Any corticosteroid         | 11 (12.8%)                      | 8 (1.2%) <sup>a</sup>    | 19 (2.5%)   |

Abbreviations: COPD, chronic obstructive pulmonary disease.  
<sup>a</sup>*P*<.001.

TABLE 3  
Respiratory Medication in the Preceding Year, Form of Presentation, and Frequency of Use by GOLD Stages

|                        | GOLD Stages |            |            |
|------------------------|-------------|------------|------------|
|                        | I (n=450)   | II (n=256) | III (n=52) |
| Respiratory medication |             |            |            |
| In the preceding year  | 66 (14.7%)  | 87 (34.0%) | 34 (65.6%) |
| Bronchodilator         | 27 (6.0%)   | 42 (16.4%) | 16 (30.8%) |
| Corticosteroid         | 4 (0.9%)    | 8 (3.1%)   | 7 (13.5%)  |
| Presentation           |             |            |            |
| Tablets                | 15 (22.7%)  | 13 (14.9%) | 11 (21.2%) |
| Inhalers               | 29 (43.9%)  | 53 (52.5%) | 19 (36.5%) |
| Nebulizers             | 4 (6.0%)    | 4 (4.6%)   | 0 (0.0%)   |
| Syrups                 | 17 (25.8%)  | 17 (19.5%) | 2 (3.8%)   |
| Frequency              |             |            |            |
| Most days              | 10 (15.2%)  | 24 (27.6%) | 12 (23.1%) |
| Response to symptoms   | 47 (71.2%)  | 55 (63.2%) | 17 (32.7%) |
| Both                   | 8 (12.1%)   | 8 (9.2%)   | 4 (7.7%)   |

<sup>a</sup>Abbreviations: GOLD, Global Initiative for Chronic Obstructive Lung Disease.

Rates of prescription of respiratory medication for COPD patients in the various centers are shown in Table 4. Only 14.1% of patients were receiving respiratory

medication in Mexico City, while 35.9% in Santiago de Chile were. Inhaled medication was used less than mucolytics in São Paulo, while in Santiago de Chile, Montevideo, and Caracas the use of inhalers exceeded 50%.

Table 5 shows factors associated with various aspects of COPD treatment. As for the application of preventive treatment, a physician's advice to quit smoking was associated with the presence of respiratory symptoms (wheezing), regardless of the degree of bronchial obstruction, and vaccination against influenza with older age and presence of cough. The use of bronchodilators was associated with prior medical diagnosis and the presence of respiratory symptoms such as wheezing or dyspnea, while the probability of being prescribed corticosteroids was greater in women, in those with a prior medical diagnosis, and in those with more severe disease, independently of respiratory symptoms.

A history of smoking was associated with both a greater use of preventive treatment and a higher rate of prescription of bronchodilators.

The use of all the therapeutic measures analyzed was associated with having undergone spirometry at some time.

TABLE 4  
Use of Respiratory Medication in the Preceding Year, Form of Presentation, and Frequency of Use in COPD Patients, by Participating Health Care Facility

|                        | São Paulo (n=152) | Santiago de Chile (n=198) | Mexico City (n=78) | Montevideo (n=174) | Caracas (n=157)         |
|------------------------|-------------------|---------------------------|--------------------|--------------------|-------------------------|
| Respiratory medication |                   |                           |                    |                    |                         |
| In the preceding year  | 28 (18.4%)        | 71 (35.9%)                | 11 (14.1%)         | 37 (21.3%)         | 40 (25.5%) <sup>a</sup> |
| Presentation           |                   |                           |                    |                    |                         |
| Tablets                | 6 (21.4%)         | 17 (23.9%)                | 3 (27.3%)          | 6 (16.2%)          | 7 (17.5%) <sup>a</sup>  |
| Inhalers               | 6 (21.4%)         | 42 (59.1%)                | 4 (36.4%)          | 28 (75.7%)         | 23 (57.5%) <sup>a</sup> |
| Nebulizers             | 6 (21.4%)         | 1 (1.4%)                  | 1 (9.1%)           | 0 (0.0%)           | 0 (0.0%) <sup>a</sup>   |
| Syrups                 | 9 (32.1%)         | 12 (16.9%)                | 3 (27.3%)          | 3 (8.1%)           | 9 (22.5%) <sup>a</sup>  |
| Frequency              |                   |                           |                    |                    |                         |
| Most days              | 2 (7.1%)          | 17 (23.9%)                | 1 (9.1%)           | 14 (37.8%)         | 12 (30.0%) <sup>a</sup> |
| Response to symptoms   | 22 (78.5%)        | 43 (60.6%)                | 9 (81.8%)          | 20 (54.1%)         | 25 (62.5%) <sup>a</sup> |
| Both                   | 3 (10.7%)         | 11 (15.5%)                | 1 (9.1%)           | 3 (8.1%)           | 3 (7.5%) <sup>a</sup>   |

Abbreviations: COPD, chronic obstructive pulmonary disease. <sup>a</sup>*P*<.001.

TABLE 5  
**Logistic Regression Analysis of Factors Associated With Preventive and Pharmacological Treatment of Patients With COPD**

| Variables                           | Odds Ratio (95% Confidence Interval)   |  |                               |                                |
|-------------------------------------|--|--|-------------------------------|--------------------------------|
|                                     | Medical Advice <sup>a</sup><br>(n=511) | Vaccination Against<br>Influenza (n=748) | Any Bronchodilator<br>(n=748) | Any Corticosteroid<br>(n=748)  |
| Age, y                              | 0.99 (0.98-1.01)                       | 1.06 (1.05-1.08) <sup>b</sup>            | 0.98 (0.96-1.01)              | 0.97 (0.92-1.01)               |
| Female sex                          | 0.70 (0.47-1.04)                       | 1.15 (0.78-1.68)                         | 1.34 (0.78-2.32)              | 4.15 (1.19-14.51) <sup>b</sup> |
| Nonsmokers                          | —                                      | 1.00                                     | 1.00                          | 1.00                           |
| Former smokers                      | 1.00                                   | 0.58 (0.37-0.91) <sup>b</sup>            | 1.15 (0.60-2.18)              | 1.66 (0.50-5.52)               |
| Smokers                             | 2.26 (1.52-3.36)                       | 0.61 (0.39-0.97) <sup>b</sup>            | 0.44 (0.22-0.89) <sup>b</sup> | 0.38 (0.09-1.60)               |
| Prior medical diagnosis of COPD     | 1.56 (0.76-3.17)                       | 0.70 (0.38-1.28)                         | 2.15 (1.14-4.07) <sup>b</sup> | 6.06 (1.85-19.81) <sup>b</sup> |
| GOLD stage I                        | 1.00                                   | 1.00                                     | 1.00                          | 1.00                           |
| GOLD stage II                       | 1.14 (0.76-1.71)                       | 1.05 (0.71-1.56)                         | 2.00 (1.13-3.55) <sup>b</sup> | 2.84 (0.76-10.72)              |
| GOLD stages III/IV                  | 0.76 (0.34-1.71)                       | 1.94 (0.98-3.83)                         | 2.22 (0.97-5.08)              | 7.68 (1.72-34.27)              |
| Cough                               | 1.15 (0.75-1.70)                       | 1.57 (1.03-2.38) <sup>b</sup>            | 0.87 (0.47-1.60)              | 1.11 (0.33-3.76)               |
| Expectoration                       | 1.03 (0.67-1.60)                       | 0.96 (0.63-1.48)                         | 1.70 (0.94-3.07)              | 0.77 (0.22-2.70)               |
| Wheezing                            | 1.79 (1.19-2.71) <sup>b</sup>          | 1.03 (0.69-1.55)                         | 2.76 (1.53-4.99) <sup>b</sup> | 0.62 (0.19-2.02)               |
| Dyspnea                             | 1.28 (0.86-1.89)                       | 0.90 (0.62-1.31)                         | 2.39 (1.25-4.54) <sup>b</sup> | 1.35 (0.32-5.72)               |
| Spirometry (performed at some time) | 2.17 (1.33-3.56) <sup>b</sup>          | 1.58 (1.02-2.46) <sup>b</sup>            | 2.21 (1.28-3.84) <sup>b</sup> | 6.40 (2.04-20.05) <sup>b</sup> |

Abbreviations: COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Chronic Obstructive Lung Disease.  
<sup>a</sup>Physician's advice to quit smoking (includes smokers and former smokers). <sup>b</sup>*P*<.05.

## Discussion

PLATINO project is the first population-based study of COPD prevalence in Latin America in which diagnosis is based on postbronchodilator spirometry and that uses standardized and reproducible protocols in all centers. It thus offers an excellent opportunity to study the treatments used in the 5 participating cities and to compare the results with situations in other countries. Published population-based studies assessing the general management of COPD patients are scarce,<sup>2,16</sup> and the PLATINO study has provided considerable epidemiological data on COPD, a disease which Chapman et al<sup>17</sup> have characterized as poorly recognized, underdiagnosed, and consequently undertreated.

The most noteworthy results emerging from this study are the inadequate medical advice and scant use of pharmacological support for smoking cessation, as well as the differences in the use of vaccination against influenza and respiratory medication that can be observed from one health care facility to another. The use of respiratory medication was associated with prior medical diagnosis, with having undergone spirometry at some time, and with severity of disease.

COPD involves a series of pathological processes that interact with each other to generate what has been called the "vicious cycle" of the disease.<sup>18</sup> It has been known for several decades that promoting smoking cessation is the only therapeutic measure that has proven effective in modifying the accelerated deterioration of lung function.<sup>9</sup> According to Fiore,<sup>19</sup> a physician's advice to quit smoking is enough to increase the number of smokers who quit by as much as 4%. In the Lung Health Study III, with 11 years of follow-up data, Anthonisen et al<sup>20</sup> reported a rate of abstinence of 22% in the group of smokers who had received intensive medical support, and 93% of those individuals continued to refrain from smoking throughout the study period. The data provided by the present study showed that only half of the population with a smoking

history had been advised to quit by a physician. Medical treatments that have been shown to be effective in improving the outcomes of smoking cessation programs, such as antidepressants and nicotine substitutes, were barely used.<sup>5</sup>

All COPD treatment guidelines recommend annual vaccination against influenza to prevent complications<sup>5,6,21,22</sup> and reduce mortality, especially in older patients.<sup>10</sup> Our data showed important differences in the use of vaccination from one health care facility to another. The highest levels of coverage were recorded in Santiago de Chile, where vaccination reached about half the patient population, while the lowest were observed in Caracas (5.1%). This may be related to its tropical climate, with no clearly defined seasons, and therefore no periods of influenza virus epidemics. Prescription of this preventive treatment was associated with older age and was independent of disease severity. These results were consistent with the data in the recently published consensus guidelines on respiratory infections.<sup>23</sup>

The IBERPOC study showed that in Spain only 19.3% of all COPD patients were treated with respiratory medication and that such treatment was more frequent in the group with most severe disease (49.3%).<sup>2</sup> A study recently carried out in Korea showed that 49% of COPD patients over 45 years old received respiratory medication, and that use increased with the severity of bronchial obstruction (11.8% in patients in stages I and II, compared to 36.4% in patients in stages III and IV).<sup>16</sup> The results of our study were consistent with previous ones and showed that only a quarter of all patients diagnosed were being treated and that the use of medication increased with the severity of the disease (stages III and IV). Of the 86 patients with a prior medical diagnosis of COPD confirmed in the present study, 75.6% were receiving respiratory medication. This percentage was somewhat lower than that found in the IBERPOC study (88%).<sup>2</sup>

While bronchodilators are the treatment of choice for COPD, our data showed a low level of use of inhaled bronchodilators and variability among health care facilities. This may be related to the lack of availability of such drugs for economic reasons, but physicians' lack of awareness of their advantages over oral medications cannot be ruled out. The lack of data from population-based studies on the use of bronchodilator treatment makes it impossible to establish comparisons with the results of the present study.

Furthermore, the use of bronchodilators in patients with COPD depends on the level of care and shows wide variation from country to country (19% in Italy and 54% in the United Kingdom).<sup>24</sup> Miravittles<sup>25</sup> has pointed out that this situation is due mainly to differences between day-to-day clinical management and the application of treatment guidelines. Similarly, the IDENTPOC study, which investigated the factors affecting drug prescription in such patients, emphasized that differences in the type of medication prescribed reflected the fact that physicians make their own decisions and do not necessarily follow treatment guidelines.<sup>26</sup> Data from selected groups of patients, such as the population that participated in the ISOLDE trial, have shown that more than 90% of patients with severe COPD (FEV<sub>1</sub> of 44%) were receiving inhaled bronchodilator therapy.<sup>27</sup>

Inhaled corticosteroids are mainly indicated for patients with advanced COPD who have frequent exacerbations. Oral corticosteroids are not recommended, except during exacerbations.<sup>5</sup> Barely 5% of COPD patients diagnosed during the evaluation performed in the PLATINO study were receiving either inhaled (2.4%) or oral (2.5%) corticosteroids. Even though their use was associated with severity of disease, they were only prescribed in 13.5% of COPD patients with FEV<sub>1</sub> less than 50%. In Europe, prescription of corticosteroids varies from country to country. Prescription rates are 9% in Germany and 22% in the United Kingdom, while it has been reported that in France a higher proportion of patients receive inhaled corticosteroids than would be expected in view of the severity of their disease.<sup>8</sup> This variability has also been observed over time, with the most recent figures available ranging from 26% to 76%.<sup>25,26</sup>

There is little scientific evidence to support the use of mucolytics for COPD and their widespread use has therefore not been recommended.<sup>28</sup> Our results showed that up to a fifth of patients (19.8%) were receiving this type of medication and that in São Paulo its use exceeded that of inhaled drugs. Data published in France and Germany have shown that a third of COPD patients receive mucolytics.<sup>24</sup>

The use of spirometry is an indicator of a higher level of information on the part of physicians and respiratory medicine departments with respect to the diagnosis and treatment of COPD. Our study has shown that prior spirometry is associated with both the use of preventive treatment and the prescription of bronchodilators and corticosteroids. This supports evidence that the availability of this technique optimizes treatment of the disease.

One of the limitations of the present study was that information on the use of respiratory medication was reported for the preceding year, and this may have resulted

in underestimation due to recall bias. However, this time interval was accepted in studies designed by other authors.<sup>29</sup> Another aspect that must be borne in mind is that the majority of patients identified as having COPD in the present study were in stage I of the disease and therefore the overall findings for use of medication and preventive treatment would have been lower.

The wide variations in treatment in the 5 large urban centers studied would lead us to expect even greater variability in the treatment offered throughout all of Latin America, especially taking into account rural areas. This suggests an imperative need to promote ongoing training of physicians and of all health care workers involved in the care of COPD patients, and to promote the implementation of nationwide programs for the diagnosis and treatment of this important disease, which is on the increase.

In conclusion, PLATINO has provided data on preventive and medical treatment for stable COPD in 5 Latin American cities and has pointed out the uneven use of available resources of proven efficacy, particularly that of a physician's advice to quit smoking. Spirometry was the main factor associated with the prescription of therapeutic measures. It thus emerges as a basic tool not only for early diagnosis of the disease, but also for the taking of therapeutic decisions. For this reason, every effort should be made to promote its widespread use.

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