



Colombia Médica

ISSN: 0120-8322

colombiamedica@correounivalle.edu.co

Universidad del Valle

Colombia

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Stable copd management in relation to the GOLD: Experience at a university hospital  
Colombia Médica, vol. 39, núm. 4, octubre-diciembre, 2008, pp. 337-345  
Universidad del Valle  
Cali, Colombia

Available in: <http://www.redalyc.org/articulo.oa?id=28339406>

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## Stable copd management in relation to the GOLD: Experience at a university hospital

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### SUMMARY

**Introduction:** This paper presents a prospective and descriptive study discussing the outpatient care plan in a public hospital in Bogotá for patients with stable COPD according with the GOLD recommendations. The paper presents as well the influence of factors such as education, pharmacological treatment, pulmonary rehabilitation and oxygen-therapy. A survey was carried out among patients, and the results were evaluated and validated by a group of experts; a personal data card for the review of clinical records was considered.

**Materials and methods:** This is a three-phase study. On the first phase, selected patients from outpatient care visits were included with a primary diagnosis of COPD on the stable condition stage; these patients had no evident exacerbation in at least one month before the survey. Clinical records, demographic data (gender, age), previous control dates, required examinations, prescribed medicines, referral to pulmonary rehabilitation programs, exercises and domiciliary oxygen-therapy were recorded. On the second phase, the survey was carried out among 61 adult patients who met the inclusion criteria and the clinical record register. On the third phase, the analysis and interpretation of the results were carried out with a statistic processing of the information, which considers multivariate and univariate data analysis using the software SPSS version 11.5 for Windows.

**Results:** The number of patients with COPD diagnosis studied during the research period of time in our hospital outpatient service was 69, however only 61 of them fulfilled all the inclusion criteria. Sixty-one patients were interviewed, average age, 73. Seventy percent were female. Fifty percent of the participants were from low schooling, social and economic segments of the population; 50% had no formal education and 93% were family dependent. The major risk factor reported (84%) was wood fire smoke, with an average exposure of more than 20 years (72%). Thirty percent considered that they had been educated about their disease by a physician, 47% used inhaled bronchodilators, 48% of whom had difficulties to obtain them. Although 56% of all patients were using home oxygen therapy, and 93% suffered some degree of dyspnea, only one patient had undergone pulmonary rehabilitation.

**Conclusions:** Our study revealed that non pharmacological therapy and patient education do not meet GOLD recommendations at a Colombian public hospital; this is due, in part, to inadequacies of the public health system and accessibility to it, lack of clinical guidelines, scant medical referral and heavy patients load. It is necessary to implement an improvement plan that will enhance COPD patient treatment and expand health care professionals participation in it.

**Keywords:** COPD management; GOLD recommendations; Quality of life.

*Manejo de la EPOC estable en relación con la GOLD: Experiencia en un hospital universitario*

### RESUMEN

**Introducción:** Estudio prospectivo-descriptivo que analiza el plan de atención ambulatorio del usuario con EPOC estable de acuerdo con las recomendaciones de la GOLD en un hospital público en Bogotá. Presenta los factores que influyen a nivel de educación, tratamiento farmacológico, rehabilitación pulmonar y oxigenoterapia. Se aplicó una encuesta para pacientes, evaluada y validada por grupo de expertos y una ficha para revisión de las historias clínicas.

**Materiales y métodos:** Estudio de tres fases. En la fase I se seleccionaron los pacientes con diagnóstico primario de EPOC en etapa estable, atendidos por consulta externa que no hubieran presentado exacerbación por lo menos un mes antes de la encuesta. Se tomaron de las historias clínicas, los datos demográficos (género y edad), fechas de control previo, exámenes

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Received for publication December 5th, 2007    Accepted for publication September 18th, 2008



solicitados, medicamentos formulados, remisión a programas de rehabilitación pulmonar, ejercicio y oxigenoterapia domiciliaria. En la fase II, se aplicó la encuesta a 61 pacientes adultos que cumplían con los criterios de inclusión y el registro de sus historias clínicas. En la fase III se hizo el análisis e interpretación de los resultados con un procesamiento estadístico de la información que comprendía análisis multivariado y univariado de datos utilizando el programa SPSS software, versión 11.5 para Windows.

**Resultados:** Durante el período de estudio se atendieron por consulta externa en la institución 69 personas con diagnóstico primario de EPOC; de estos, 61 cumplían con los criterios de inclusión. La edad media del grupo fue 73 años y 70% eran mujeres; 50% tenía bajo nivel socioeconómico y ningún grado de escolaridad; 93% tenía dependencia económica de su familia. El mayor factor de riesgo, fue humo de leña (84%), con un promedio de exposición de 20 años; 30% recibió educación por parte del médico, 47% usaba broncodilatadores inhalados y 48% refería dificultades para conseguirlos. Sólo un paciente había asistido a rehabilitación pulmonar aunque 56% utilizaba oxígeno domiciliario y 93% presentaba algún grado de disnea.

**Conclusiones:** La implementación de la terapia no farmacológica y de educación está lejos de las recomendaciones de la GOLD, sea por influencia del sistema de salud, trámites administrativos, accesibilidad, uso de guías, poca remisión médica o la carga para los profesionales. Es necesario establecer un plan de mejoramiento con cobertura efectiva para optimizar la atención y la calidad de vida de las personas con EPOC.

**Palabras clave:** Manejo de la EPOC; Recomendaciones GOLD; Calidad de vida.

Chronic obstructive pulmonary disease (COPD) is a progressive lung disease with many physical, mental and social consequences. Symptoms such as dyspnea and fatigue affect functional capacity, causing a progressive decrease in the ability to carry out daily activities, and limiting physical exercise which leads to imminent disability, dependency and isolation. COPD is a systemic and multifactor disease that must be approached from different perspectives and through integral and interdisciplinary management.

In an effort to make an effective and timely response to COPD, as well as to unify efforts in the management of the disease, in the year 2001, medical experts from diverse countries along with representatives from the World Health Organization and the National Heart, Lung and Blood Institute of the USA, published the

guide known as *Global Initiative for Obstructive Lung Disease* (GOLD). This guide includes the most relevant aspects for integral COPD patient intervention and is based upon sound scientific information which is constantly updated<sup>1</sup>.

GOLD stimulates the implementation of strategies aimed at preventing and controlling the progress of the disease, diminishing symptoms, improving exercise tolerance and health condition, preventing and treating complications and exacerbations, and reducing mortality<sup>2</sup>. This is achieved by using four components that guarantee effective and integral COPD management:

1. Assessment and monitoring.
2. Reduction of risk factors.
3. Management of the stable COPD.
4. Management of exacerbations.

The objectives of GOLD also include raising consciousness among the medical community and health institutions and promoting research in handling COPD within the context of a given country in order to create strategies that would improve diagnosis and treatment.

The purpose of this study was to identify the characteristics of the outpatient care treatment plan used for COPD patients at a university public hospital in Bogotá, Colombia, and to compare this plan to the third GOLD component. The selection of this component was based on the need to establish the state of COPD outpatient pharmacological and non pharmacological treatment, according to international recommendations; keeping in mind the influence of local, social and legal conditions as well as the access to resources and infrastructure that allow the application of international recommendations.

## MATERIALS AND METHODS

An exploratory qualitative study was designed to evaluate and analyze stable COPD outpatient care for adult patients under outpatient care at a III level care university public hospital, in the city of Bogotá. This public hospital includes 360 beds, and took care of 135,000 outpatient visits for all services during 2005; 850 of them were under COPD outpatient care.

In the initial phase, methodological design included a technical review of current international COPD guidelines. As a result of this process, the GOLD guide was selected as the reference standard for our study,



since we deemed it to be the most outstanding in its consensus, scientific rigor, international application and up-to-date management criteria. Once this process had been completed, evaluation variables and indicators were established. A patient survey was designed, evaluated and approved by experts. In order to ensure greater data precision, clinical records of the interviewed patients were reviewed and then compared to patient survey information, on dates, prescribed tests, medication, pulmonary rehabilitation, exercise, and home oxygen therapy.

Data were obtained over a four month period from September to December 2005, during which 69 patients with primary COPD diagnosis where treated; 61 of them met the inclusion criteria. The survey was taken on them and a review was made of their clinical records. Of the 61 participants, 45 were pulmonary outpatients and 16 were internal medicine outpatients. For inclusion in the survey, patients had to meet the following criteria: at least one COPD outpatient visit, COPD primary diagnosis, no exacerbation during the previous month, ability to verbally answer questionnaire and signed consent. Exclusion criteria included: cognitive alterations (2 out of the 69), inability to properly provide personal information, contradictory information and exacerbation at the time of the interview (6 of the 69).

The statistical study of the data obtained covered the univariate and multivariate analysis using the SPSS version 11.5 for Windows statistical program. Initially, a manual tabulation was made including charts to allow for the analysis of each component of the applied instrument. In order to facilitate its subsequent digitation, each question was classified as a variable, and, in turn, the answers were classified in categories. 61 variables matching the survey instrument applied to the patients were classified (personal data, risk factors, associated lung diseases, impact of the disease, diagnosis tests, symptoms, risk factors reduction standards, education, drug treatment, non-drug treatment, hospitalizations and home care treatment during the last year) plus seven (7) variables added to the clinical records review card (medical control, described diagnosis tests, prescribed medicines, referral to lung rehabilitation programs and physical exercise, oxygen therapy, compliance with lung specialist or internal medicine visits), the purpose of this card is to limit information bias, matching focal points in the handling of patients with the answers

given by patients in the surveys. The survey variables and the clinical record card allowed for the sorting out of aspects related to diagnosis and outpatient care management of COPD. The survey included some open questions with the purpose of providing information for the analysis of aspects impacting the effective development of the care plan, related as well to the patients. These answers were classified by categories. Subsequently, a multivariate analysis was performed, through the crossing of variables, with the purpose of detecting dependence and independence relationships among variables. Finally, results obtained from the application of tools were compared to the recommendations in component 3 of the GOLD document, with the purpose of establishing similarities and differences, thus proceeding towards discussion and analysis.

## RESULTS

Although the international GOLD guide includes four components, our research focused exclusively on component 3 which deals with aspects of stable COPD patient management, such as: patient education; pharmacological and non pharmacological treatment, including oxygen therapy, pulmonary rehabilitation, breathing support and surgical alternatives.

**Sample Profile.** Sixty-one patients were surveyed; average age 73, female majority (70%), low scholastic and social economic level (50% with no formal education), and high family dependence (93%). A large percentage (66%) felt that the disease had affected their social activity and participation in family life, and more than one third (38%) expressed the need for help in carrying out daily activities. The main impediment which patients mentioned was the presence and intensity of their symptoms; 93% had some degree of dyspnea, far above the 3/5 Medical Research Council Scale and 56% reported using home oxygen therapy (Table 1).

Due to the fact that our survey was predominantly made up of low income individuals who had cooked at home on wood burning stoves in the countryside, the major risk factor reported (84%) was wood fire smoke, 72% of them, with an average exposure of more than 20 years. Fifty-two percent of patients were smokers, making cigarettes the second most frequent risk factor, more than 20 packages per year (29%). The third most frequent risk factor (41%) was on-the-job exposure to



**Table 1**  
**COPD patients characteristics of the 61 participants. September-December 2005**

Impediments	n	%
Assistance with daily activities	23	38
Dyspnea: Grade 1	11	18
Grade 2	6	10
Grade 3	9	15
Grade 4	13	21
Grade 5	18	29
Hospitalization during previous year	33	54
Difficulty obtaining medication	29	47
Unfamiliarity with medication	15	25
Difficulty obtaining oxygen	7	20
Risk factors		
Wood-burning kitchen stoves	51	84
Wood-burning kitchen stoves 20 or more years exposure	44	72
20 or more years exposure (cigarettes)	32	52
Cigarettes exposure 20 or more packs/year	18	29
On-the-job chemical, mineral, organic exposure	25	41

Source: Clinical record card and survey among patients in the study

chemicals, minerals or organic particles (Table 1).

**Pharmacological treatment.** Our study revealed that pharmacological treatment consisted of: inhaled bronchodilator in combination with vaccines (41%) inhaled bronchodilator in combination with corticosteroids and vaccines (23%); inhaled bronchodilator (21%); inhaled bronchodilator in combination with vaccines and antibiotics (8%), and/or mucolytic agent, vaccines and corticosteroids (7%). Of the 61 participants, seventy-five percent knew what medication they were taking, and 62% reported having received information on the proper use of their prescribed medication. Neither scholastic level nor the fact of having undergone pulmonary rehabilitation influenced patient knowledge about medication. However, those patients with the severest respiratory difficulties exhibited the greatest knowledge of how to use medication (63%).

Forty-seven percent of patients reported difficulty in obtaining medications, due mainly to lack of availability from health providers, but also to patient inability to pay. Among the sample participants, those who suffered from cough, expectoration and breathing difficulty responded that inhaled bronchodilators were

the best-known medication (48%).

**Oxygen therapy.** Out of the 56% of patients receiving home oxygen therapy, 88% were being treated by a lung specialist, 21% reported difficulties in obtaining oxygen, and 91% used it more than 12 hours a day (Table 2). Home oxygen therapy patients reported the greatest number of visits to outpatient services and the most hospitalizations during the previous year due to the fact that their symptoms had worsened (59%). None of them had attended physical exercise programs or pulmonary rehabilitation.

**Pulmonary rehabilitation.** Although GOLD recommends that all COPD patients should attend a pulmonary rehabilitation program, only one of the 61 patients in our study (2%) had done so. This patient was the most adept at recognizing alarm symptoms. The rest of the patients indicated that they had not received proposals to attend such programs, in spite of the fact that 56% were using home oxygen therapy; 93% exhibited some degree of dyspnea and 54% had been hospitalized during the previous year. The lack of pulmonary rehabilitation can be attributable, in large part, to the fact that the hospital does not have an institutional pulmonary rehabilitation program.



**Table 2**  
**GOLD component 3 management characteristics**

Treatment	n	%
<b>Pharmacological</b>		
Bronchodilator and vaccines	25	41
Bronchodilator with vaccines and corticosteroids	14	23
Bronchodilator	13	21
Bronchodilator with vaccines and antibiotics	5	8
Mucoidal and/or corticosteroids	3	5
Bronchodilator and corticosteroids	1	2
<b>Non pharmacological</b>		
<b>Oxygen Therapy</b>		
Home oxygen therapy	34	56
12 to 24 hours a day	21/34	62
24 hours a day	10/34	29
Less than 12 hours a day	3/34	9
1 year or more	21/34	62
<b>Rehabilitation</b>		
Pulmonary	1	2
Physical exercise	5	8
<b>Education</b>		
Medication	38	62
Nutrition	21	34
Disease	18	30
Exercise	13	21
Risk factors	12	20
Symptoms	56	92
Home treatment	38	62

Source: Clinical record card and survey among patients in the study

Furthermore, the entire Bogotá public hospital system, located in a city of 6.7 million, where only 4 recognized lung rehabilitation programs are included, two of which are government run.

Five patients (8%) reported having attended exercise programs, and they had had the lowest number of hospitalizations and check ups during the previous year.

**Education.** COPD patient education is a primary GOLD recommendation. However, the patients in our study responded that they had received education about

their disease only 30%, its risk factors 20%, the benefits of physical exercise 21% and nutritional recommendations 34%. Nevertheless, most of them (62%) had received instructions from their physician on the proper use of medication, and 92% recognizing exacerbation and home treatment (Table 2).

**Surgical procedures.** Fifty-nine patients reported that they had not received proposals for lung surgery. Neither one of the two patients who had been informed of pulmonary surgical alternatives, had actually undergone surgery.



## DISCUSSION

It is necessary to emphasize that the results come from just one university hospital, a III level care public hospital in the city of Bogotá, which did not count in its premisses at the time of the study with any spirometrics equipment, or an assistance program in pulmonary rehabilitation or any human and/or physical resources to develop the educational component at its facilities. On the other hand, it is important to state that the highest number of patients with a primary COPD diagnosis recorded by the Systems Department in the hospital is produced by hospitalization (671 patients between 2000 and 2003). This figure could be much higher since many of the patients treated in the emergency room or by internal medicine, evidence some decompensation by some other pathology associated to COPD, such as chronic congestive heart failure, pneumonia which has been contracted in the community, among others, which could partially conceal the reality of hospitalizations and medical visits associated to this pathology.

Upon analyzing the GOLD guide recommendations for pharmacological and non pharmacological treatment of the stable COPD patient, we observed that social and economic conditions, legislation, economic resources and infrastructure at the local level have an undeniable influence on the application of GOLD international recommendations. In studies such as the IBERPOC, Spain 1999, it was revealed that only 39% of local COPD patients had received adequate treatment, which roughly corresponds to our study findings. Their research observed that in addition to non compliance with GOLD recommendations, there also existed many undiagnosed cases, combined with a lack of coordination and consensus among health professionals, which can also be observed in our local setting<sup>3</sup>.

GOLD recommends that the objective of COPD pharmacological therapy is the prevention and control of symptoms, reduction of frequency and severity of exacerbations, improved health conditions and tolerance to exercise through the use of inhaled bronchodilators, corticoids, vaccines and antibiotics<sup>4</sup>. Our study revealed that these recommended objectives were important to both physicians and patients in our local setting in spite of a multitude of difficulties in meeting them. And, that furthermore, these objectives gained importance as the disease became more severe.

Pill<sup>5</sup> and Bourbeau *et al.*<sup>6</sup> relate patient scholastic level to knowledge of the importance and use of medication and to commitment to adopt behavior that will positively influence health; however, within our sample, knowledge of medication and how to use it bore no relation to patient scholastic level, but rather correlated to a greater ability among those patients with the severest symptoms. In other words, the degree of experience with limitation to air flow, co-morbidity and frequency of exacerbations had more influence on compliance with prescribed treatment than did patient scholastic level, behavior, life style or social economic level.

Our study also revealed that even though physicians in our local setting were aware that they should follow international COPD pharmacological recommendations in order to achieve maximum treatment results, this has not always been possible due to local circumstances such as patient difficulty in obtaining medication, for economic or other reasons, lack of basic insurance coverage, either public or private, and other factors which depend upon public policy.

As part of the discussion on how to favor COPD pharmacological treatment, Pauwels *et al.*<sup>1</sup>, and Campos & Warnner<sup>7</sup>, recommend that strategies should include treatment of tobacco dependency, discussion of current therapeutic regimes, evaluation of medication dosages and adherence to treatment. Additionally, each medical check up should include more precise information on disease progression, medication effectiveness and side effects. Furthermore, medical professionals should analyze why patients suffer lengthier relapses and/or greater physical deterioration and disability before prescribing further medication.

These recommendations should contribute to breaking what could be considered to be the vicious circle of exacerbation, medical check up, hospitalization, greater physical, mental and social deterioration, followed by disability and death. The health care workers who treat COPD patients must develop an aggressive, ambitious attitude which must enable them to deal successfully with management, political and ethical problems which are directly provoking the increasing and fast deterioration of this disease.

The GOLD advocates the use of long term oxygen therapy as a means for extending life span, improving sleep and intellectual ability of hypoxemic patients. It



is also deemed an effective strategy for increasing exercise tolerance, even among unsaturated patients<sup>8,9</sup>, because it indirectly enhances the development of patient autonomy.

Our study revealed that those patients with advanced symptoms were receiving supplementary oxygen at home, but in some cases their supply was not constant due to economic hardship. The home oxygen available to these patients was not portable, which meant that their mobility was greatly restricted: they complained of not being able to exercise, not being able to attend social and family functions, of only staying home and moving around in a reduced area. This isolation contributed to aggravating the move towards even more inactivity, more dyspnea, more disability, and hence reduced quality of life. It is necessary to create strategies allowing for the long term use of oxygen, not just to improve survival rates, but also to benefit the quality of life and daily activities.

The GOLD guide, as well as the internationally recognized and widely followed American Thoracic Society<sup>10</sup> and European Respiratory Society<sup>11</sup> guidelines, recommends pulmonary rehabilitation programs to treat COPD symptoms. These programs are aimed at reducing patient disability in order to improve functional independence and quality of life. A complete pulmonary rehabilitation program includes patient education, physical exercise, nutrition and psychological support. COPD patients who receive pulmonary rehabilitation find that their health improves, that they suffer from lower co-morbidity, and that the need to visit the doctor or to be hospitalized diminishes; furthermore, patients and their families become better informed and more involved in the management of the disease<sup>12</sup>.

Although pulmonary rehabilitation is a multidisciplinary undertaking, evidence reveals that its most effective component is exercise training. According to several studies<sup>13,14</sup>, when exercise training is the primary element of pulmonary rehabilitation there is a reduction in dyspnea and leg fatigue; as exercise tolerance increases, cardiovascular and musculoskeletal systems are strengthened; hence, the patient becomes more motivated and his/her general health condition improves. GOLD recommends that all COPD patients should participate in physical training programs in order to facilitate their daily activities and to decrease disability<sup>15,16</sup>.

Our study revealed that only 6 among the 61 patients surveyed had undergone any kind of pulmonary rehabilitation: 5 patients had attended some exercise classes, and 1 had attended an institutional pulmonary rehabilitation program. The remaining 55 patients reported that they had neither been informed of, nor prescribed, any kind of pulmonary rehabilitation. This result brings to light the fact that COPD treatment in our local setting focuses almost exclusively on pharmacological therapy (Table 2).

Therefore, it is urgent to create a multidisciplinary pulmonary rehabilitation program in our local setting which would not only improve patient health conditions and quality of life, but would also contribute to more efficient use of public health care budget, professional health services and hospital facilities. Such a program should be easily accessed by patients and should be able to count on institutional and professional support and management.

The GOLD guide points out that even though education does not improve patient exercise capacity or pulmonary function, it does enhance patient ability to understand and to take control of disease management<sup>17</sup>.

Among our sample study group, we discovered that the patients, who possessed the greatest general knowledge of COPD and of their pharmacological therapy, were those who suffered from the severest and most chronic symptoms of the disease. Additional studies are required to further analyze the outcome and benefits of COPD patient education; some researchers claim that patient education only results in patients being better informed about their disease<sup>18,19</sup>.

Nevertheless, we believe that COPD patient education should be encouraged as a means to aid patients in handling their disease. Education in our local setting should be based upon simple, practical strategies, with easy follow up and aimed at allowing patients to learn about risk factors, progress signs and commitment to therapy that would lead the way to a more positive patient outlook and improved life style.

At the present time, surgical procedures such as lung volume reduction surgery or pulmonary transplant may contribute to diminishing dyspnea and to improving exercise capacity and quality of life for certain COPD patients. But, as the GOLD guide points out, these surgical procedures are costly for both health care institutions and the health care system itself. Further-



more, the cost-benefit of COPD surgical procedures compared to conventional COPD therapy is still the object of debate<sup>20</sup>. In our sample study group, these surgical procedures were not well recognized as therapeutic alternatives; besides, these options continue to be of limited and difficult access in our local setting.

## CONCLUSIONS

We concluded that our review of current COPD patient treatment, revealed that there existed inadequate access to medication, education, physical exercise programs and pulmonary rehabilitation. However, in such a setting, the treatment program did come close to meeting some GOLD recommendations, especially for pharmacological treatment. It was in the non pharmacological aspects of COPD treatment in which compliance with GOLD recommendations was lacking; specifically, pulmonary rehabilitation.

Due to the fact that most of the patients in our study had been diagnosed with COPD late in the progression of their disease, as well as to the fact that treatment guides had not been adequately adhered to, we encountered a large group of elderly patients with co morbidities and a passive attitude towards controlling their disease. They depended on hospital support during crisis which led to major psychological and social distress, and to further limitations in carrying out daily activities, as well as to the deterioration of quality of life.

Many health professionals in our local setting who are involved in COPD treatment accept the current COPD patient situation as just part of «the normal circle of patient deterioration and hold that treatment be aimed at maintaining acceptable health conditions». This attitude may prevail, in part, because the low income, socially deprived COPD patient in our local setting oftentimes does not have access to diagnostic tests, vaccinations, COPD education and rehabilitation and will thus inevitably deteriorate in spite of the good intentions of health care workers.

We propose that local COPD treatment plans be made more accessible and equitable, and that the non pharmacological aspects be more precisely developed so that they will be better understood and more beneficial to both patients and health care workers. It is also important that local public health policies concentrate on educating the population on how to reduce the

predominant risk factors which are wood burning kitchen stoves and cigarettes. Furthermore, as health care professionals dedicated to treating COPD patients, we must develop a more challenging, ambitious attitude towards improving treatment even though this may mean overcoming administrative, legislative and economic obstacles.

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