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## Chronic obstructive pulmonary disease (COPD) in Spain and the different aspects of its social impact: a multidisciplinary opinion document

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### ABSTRACT

Chronic obstructive pulmonary disease (COPD) is one of the most prevalent diseases in the World, and one of the most important causes of mortality and morbidity. In adults 40 years and older, it affects more than 10% of the population and has enormous personal, family and social burden. Tobacco smoking is its main cause, but not the only one, and there is probably a genetic predisposition that increases the risk in some patients. The paradigm of this disease is changing in Spain, with an increase of women that has occurred in recent years. Many of the physiopathological mechanisms of this condition are well known, but the psychological alterations to

which it leads, the impact of COPD on relatives and caregivers, the limitation of daily life observed in these patients, and the economic and societal burden that they represent for the health system, are not so well-known. A major problem is the high under-diagnosis, mainly due to difficulties for obtaining, in a systematic way, spirometries in hospitals and health-care centers. For this reason, the Fundación de Ciencias de la Salud and the Spanish National Network Center for Research in Respiratory Diseases (CIBERES) have brought together experts in COPD, patients and their organizations, clinical psychologists, experts in health economics, nurses and journalists to obtain their opinion about COPD in Spain. They also discussed the scientific bibliometrics on COPD that is being carried out from the CIBERES and speculated on the future of this condition. The format of the meeting consisted in the discussion of a series of questions that were addressed by different speakers and discussed until a consensus conclusion was reached.

**Keywords:** COPD, Chronic Obstructive Pulmonary Disease, Psychological impact, Health-Care burden, Health Economics, Spirometry, Research bibliometrics, Patients organizations

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## Enfermedad Pulmonar Obstructiva Crónica (EPOC) y diferentes aspectos de su impacto social: Un documento multidisciplinar de opinión

### RESUMEN

La enfermedad pulmonar obstructiva crónica (EPOC) es una de las enfermedades más prevalentes en el mundo y una de las causas más importantes de mortalidad y morbilidad. En los adultos de más de 40 años, afecta al menos al 10% de la población y tiene una enorme carga personal, familiar y social. El tabaquismo es su principal causa, pero no la única, y probablemente existe una predisposición genética que aumenta el riesgo en algunos pacientes. El paradigma de esta enfermedad está cambiando en España, con un aumento de la incidencia en mujeres que se ha producido en los últimos años. Muchos de los mecanismos fisiopatológicos de la EPOC son bien conocidos, pero no lo son tanto las alteraciones psicológicas a las que conduce, el impacto de la enfermedad en los familiares y cuidadores, la limitación de la vida cotidiana que se observa en estos pacientes y la carga económica y social que representan para el sistema sanitario. Un problema importante es el elevado infra-diagnóstico, debido principalmente a las dificultades para obtener, de forma sistemática, espirometrías en los hospitales y centros de salud. Por este motivo, la Fundación de Ciencias de la Salud y el Centro de Investigación en Enfermedades Respiratorias (CIBERES) han reunido a expertos en EPOC, pacientes y sus organizaciones, psicólogos clínicos, expertos en economía de la salud, enfermeras y periodistas para obtener su opinión sobre la EPOC en España. También se ha hablado de la bibliometría científica sobre la EPOC que se está llevando a cabo desde el CIBERES y se ha especulado sobre el futuro de esta enfermedad. El formato de la reunión consistió en la discusión de una serie de cuestiones que fueron abordadas por diferentes ponentes y discutidas hasta llegar a una conclusión consensuada.

**Palabras clave:** Enfermedad Pulmonar Obstructiva Crónica, Impacto psicológico, Carga de trabajo, Atención sanitaria, Economía de la Salud, Espirometría, Investigación bibliométrica, Organizaciones de pacientes

### INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is one of the most frequent causes of morbidity and death in the World, and in Spain. Chronic inhalation of toxic fumes, particularly from tobacco smoke, is the most common causal risk factor, but not the only one. COPD usually appears in its most severe and symptomatic forms after the age of 65, considerably diminishing quality of life and the possibility of having an independent, autonomous life.

The available scientific information on COPD is vast, particularly biomedical information on COPD. However, data regarding other aspects, such as: the impact in the daily life of patients, the experience of care-givers, the economic impact in the health-care system and the attention from the mass-communication media to this problem, have received less attention.

For all the above-mentioned reasons, the Fundación de Ciencias de la Salud and the Spanish National Network Center for Research in Respiratory Diseases (CIBERES) organized a meeting, about COPD in Spain, bringing together experts from very different areas, as well as patients and their associations. We aimed to discuss, not only the clinical manifestation or the treatment of the disease, but mainly the impact in patients' daily life, in their caregivers, and in other related areas such as: the economy, the non-specialized press, and the health-care system organization.

All participants received a series of questions about COPD, which the coordinators felt needed an answer based on evidence, otherwise also on opinion. Each one of the speakers presented one of the questions, providing the information that allowed, after a discussion among all the members of the panel, to reach a response agreed upon by all.

As a disclaimer, all panel members participated, in their personal capacity, and the opinions they expressed do not necessarily represent those of their working groups or institutions.

This document is not intended to provide recommendations or therapeutic guidelines, but simply to help to establish a debate, and present an abridged collection of approaches and opinions of participants.

The meeting took place in Barcelona on October 31st, 2018, and this document tries to summarize the main issues discussed, the documentation provided on them and the conclusions that were agreed upon by the group. The final document has been approved by all participants, and it represents the group's opinion.

### MATERIAL AND METHODS

Questions were chosen by the coordinators and agreed upon by all speakers. They were classified in three main groups of issues: the situation of the problem in Spain; its social and economic dimension; and the possibilities of effective improvement.

The document, edited in a first draft, was sent to all co-authors for their corrections and amendments. The final document has been reviewed and approved by all authors.

Next, we will review the questions posed, the arguments provided, and the conclusion reached by topic.

#### Question 1. What is the dimension of the COPD problem in Spain?

##### Text:

COPD is an important cause of morbidity and mortality in Spain, with a high health, economic and social impact. It is now widely recognized that COPD is a heterogeneous and complex syndrome, with pulmonary and extrapulmonary involvement [1]. In usual clinical practice, the diagnosis of COPD is based on the evaluation of exposure to tobacco smoke or other harmful fumes and gases, the presence of persistent res-

piratory symptoms (exertional dyspnea, cough with/without expectoration) and the identification of a persistent airflow limitation, documented by spirometry after a bronchodilator test [1, 2].

While direct or indirect exposure to tobacco smoke is considered the primary, causal COPD risk factor, other environmental exposures (biomass, marijuana and other smoked or vaped substances, air pollution, occupational exposures, and else) may contribute to its development, as well as individual host factors (gender, genetic abnormalities, abnormal lung development, accelerated lung aging, or neonatal respiratory infections) may predispose to it [1, 2].

COPD screening should be considered in any person over the age of 50 with dyspnea and/or cough as well as exposure to risk factors, tobacco smoking being the most relevant [3]. The EPISCAN study, carried out in 2007, reported a prevalence of 10.2% of COPD in the general Spanish population 40 to 80 years old, with great variability among the participating centers [4]. Other studies such as PLATINO estimated even higher prevalence, 14.3%, in Latin American capitals over 40 years of age [5, 6]. Previously, IBERPOC estimated that in Spain 1,228,000 people between 40 and 69 years old suffered from COPD [7].

Variations in COPD prevalence are largely a reflection of cumulative exposure to tobacco smoke. During the last decade, health policies have changed, with the entry into force of the Anti-smoking Law 28/2005 of 2006 and the subsequent amendment of 2011 by Law 42/2010. On the one hand, it is sensible to think that these health interventions of primary prevention could contribute to a decrease in the prevalence of COPD, since tobacco in Spain continues being the main cause of COPD. On the other hand, since the first EPISCAN study, forms of smokeless tobacco such as electronic cigarettes have appeared, and it will be of interest to assess the impact that this type of device has had on the smoking of the population and on the development of COPD and other respiratory conditions.

#### Conclusion:

**The prevalence of COPD in Spain is high and is estimated to affect more than 10% of the adult population. The geographical variation is wide, and the most important and consistent risk factor is tobacco smoke.**

**Question 2. Is there a significant COPD underdiagnosis? Of what magnitude? For what reasons?**

#### Text:

It is well established that tobacco smoking is the first cause and the most important risk factor for developing COPD in Spain. In patients who continue smoking, lung function decreases more rapidly than in those who quit. At any rate, the frequency of tobacco use remains high, and a high proportion of patients with COPD (close to 40%) continue smoking despite suffering symptoms of the condition [3].

According to the National Health Survey 2017 of the Min-

istry of Health, Consumption and Social Welfare of Spain, in 2017, the prevalence of smokers fell to 22% of the population, the lowest figure in the last 30 years. The report also presented important differences between men and women: 25.6% of men smoked daily, compared to 18.8% of women. The previous figure, from the 2011-12 survey, was close to 24%. However, this decrease is taking place at a slower pace in women than in men.

During this meeting, the results of EDADES, the Survey on Alcohol and Drugs in Spain, were released. The number of minors who had smoked in the last year increased from 20.6% in 2015 to 25.4% in 2017, and globally there was a notable increase in smoking to reach a worrying 34% of adults in 2018, which should be monitored.

More resources should be devoted to controlling tobacco smoking in the population and, above all, in patients with COPD, which could be carried out at different levels: state regulations, educational interventions, cutting smoking in current smokers ... It is well known that a simple, brief advice from a health-care professional increases the likelihood of quitting smoking. However, the overall success rate of smoking cessation is low. Consequently, there is an urgent need to demonstrate the efficacy of all interventional strategies in tobacco use, including a report on lung age. It is essential to underline the need to treat tobacco addiction (ICD10 F17 disease) as a chronic, relapsing disorder. Health professionals have an obligation to emphasize to our political representatives the need to promote research into smoking cessation.

Despite its high prevalence rates, COPD remains a disease with high rates of under-diagnosis, with percentages in Spain of 78% in 1997 and 73% in 2007. This fact leads to diagnoses in advanced stages, when there is a greater risk of exacerbations and mortality [8]. It is estimated that more than 1,595,000 Spaniards do not know they suffer from the disease and, therefore, do not receive any treatment for their COPD. The reasons for this are multiple and complex. The main one is the low use of spirometry in the general population and in the "at risk" population. There is an association between not having a diagnosis of COPD and living in rural areas, being female, having a younger age, low socioeconomic level, and absence of a previous history of smoking [9].

The global estimates in 2010 indicated that COPD was already considered the third global cause of mortality [10, 11], so an early diagnosis is of vital importance.

In 2017, a new epidemiological study was planned to update the prevalence and determinants of COPD in Spain, with representation from all 17 Autonomous Communities (CCAA). The aim would be to extend the assessment beyond spirometry, contemplating other dimensions with questionnaires of respiratory and non-respiratory symptoms, a broader functional evaluation and, in some cases, biological tests such as inflammatory markers, and imaging with low-radiation computed tomography[12].

**Conclusion:**

The underdiagnosis of COPD is a generalized and universal fact. In Spain it is estimated that it exceeds 70% of cases and the reasons most frequently related to under-diagnosis are limited use of spirometry in the population at-risk, residence in rural areas, female gender, having a low socioeconomic level, and absence of a previous history of smoking.

**Question 3. How to address the implementation of spirometry in Primary Care?****Text:**

Spirometry is a diagnostic tool that should be widely performed in Primary Care, since it is there where patients with respiratory diseases, such as COPD and asthma, are most frequently detected: They will benefit from an early diagnosis that will allow both preventive and therapeutic measures to be taken to avoid their progression [13].

To make this possible, it is essential to train both the medical and nursing staff who should perform the test. This training should be regulated and include all the following [14-17]:

- Basic knowledge of pulmonary physiology.
- Indications and contraindications of the test.
- Knowledge of the measures necessary to achieve correct maneuvers.
- Recognize technical errors and know how to avoid them.
- Evaluation of the curves made, and selection of the most suitable according to acceptability and reproducibility criteria.
- Knowledge to interpret spirometric patterns.
- Ability to evaluate the patient's physical or intellectual circumstances that modify the technical requirements of the maneuver, such as patients in wheelchairs, mental problems, etc.

This technique should be known by all nursing staff and must be integrated with the rest of the techniques performed daily, to minimize waiting times. It would be advisable to avoid delays between the prescription and its performance, overall one week or shorter.

Training, in most countries, is carried out by means of accredited courses and workshops [18-20], lasting between 5 and 12 hours, which enable this technique to be carried out adequately in the health center, where most of the time only forced spirometries are carried out with a computerized spirometer. There are international [21] and national initiatives for the accreditation of "spirometrists", such as the "Spirometry Driving License" of the European Respiratory Society, [22] or the Training Course in Spirometry of the Spanish Society of Family and Community Medicine, [23] and the Federation of Associations

of Community Nursing and Primary Care (FAECAP). This training must be completed with adequate recycling and maintenance of skills, through regular courses or workshops [18, 24].

Despite certain articles [25-27] of national scope, where an enormous variability between different autonomous communities is identified, and the low adaptation to the quality criteria established by the national regulations on spirometries, there is a clear example that Primary Care spirometry is possible, which is the Balearics Program of Spirometry in Primary Care. There, after a comprehensive training in spirometry, a significant improvement has been achieved since its implementation in both process and result aspects, with an increase in the number of spirometries in all centers, in the proportion of patients diagnosed with asthma and COPD with spirometry, and in the proportion of quality spirometries.

**Conclusion:**

**Spirometry is a technique that should be performed in Primary Care by properly trained nurses, through courses currently available in both national and international scientific societies. There is a great interregional variability in the performance of spirometries in Primary Care in Spain, being the Balearics Program one of those that has accredited and demonstrated better results.**

**Question 4.- What is the burden of work-related and personal disability due to COPD?****Text:**

There is no available macroeconomic data in Spain on the distribution of sick-leaves due to COPD [28]. In a recent report, pooling data on temporary work disability in Catalonia between 2010-15, the main cause was respiratory conditions, which caused 21% of them, excluding those due to infections or tumors [29].

COPD costs can be divided into direct costs (drugs, tests, hospital admissions, consultations, etc.) and indirect costs (permanent disability, sick leave, career-related, etc.), the latter being always more difficult to measure. It is estimated that 60% of the expenses generated by COPD are attributable to indirect costs [30].

Another relevant point for estimating work-related costs of COPD is the percentage of COPD patients of working age. In studies based on surveys, this percentage ranges from 23 to 36%, increasing in prevalence studies to 45% (30-32).[30-32]

In two Spanish studies, between 8 and 13 % of patients with COPD in active employment had had sick leave in the last year [32, 33]. In another study, published in 2018, on 3,627,107 episodes and 237,219,230 days of temporary incapacity in Catalonia between 2007 and 2016, 3% were considered to be due to tobacco, of which 66% of the episodes and 23% of the days on sick-leave were attributable to respiratory causes [29].

Extrapolating the previous data to the national set, we can calculate that in Spain there are about 3,000,000 patients with COPD, and among them there would be between 100,000 and 150,000 lost work days per year.

As for permanent disability, it has been estimated that 5 to 10% of all permanent disabilities in Spain are due to COPD [32-34]. The cost per patient of permanent, early retirement has been estimated at 5,645 euros per patient [35, 36]. To this amount, the cost of the caregiver should be added, plus nursing homes and those due to COPD comorbidities.

The calculation of Disability-Adjusted Life Years (DALY's) is a way of quantifying the burden of an illness, by taking into account years of life lost plus years of life lived with disability. A DALY can be considered as a health-weighted lost year of life. Data from Spain corresponding to 2016 show that COPD caused a total of 654.4 x 100,000 (610.9-705.7) DALYs, being the 7th cause in the overall ranking of causes of DALYs, that is contributing to 2.8% of the total DALYs. The number of DALYs due to COPD is highly variable, depending on age and sex, increasing more than 10 times in men over 80 years up to values of 8,274 x 100,000 (7,417-9,259). In this age group, COPD represents the 3rd position in the overall ranking of DALYs, just behind ischemic heart and Alzheimer's disease.

#### Conclusion:

**In Spain, COPD generates between 5% and 10% of all permanent sick-leaves. Globally, COPD is attributed with 650 DALYs per 100,000 inhabitants, although in men over 80 years this rate increases up to 8,274 DALYs per 100,000.**

**Question 5.- How much does COPD costs to society? How does Spain compare with countries of similar level of development in this aspect?**

#### Text:

It has been already mentioned, 10.2% of individuals aged 40 to 80 years old in Spain have COPD, [4] and this trend is expected to increase, due to population ageing. In a large study carried out more than a decade ago in the USA, the average direct annual cost of COPD was calculated at 1,876 USD per patient, although this cost depended on the severity of the patient (from 1,484 to 2,911 USD). Of this expenditure, 43.8% corresponded to hospital expenditures, 40.8% to drugs, and 15.4% was due to diagnostic tests and medical visits [37].

A very recent study in Extremadura, calculated an average annual expenditure per patient with COPD of 3,077 Euros, with a distribution that attributes 43.8% to direct health expenditure (1,645 Euros), 38.3% (1,440 Euros) to direct non-health expenditure (non-health centers, caregivers, etc.) and 17.9% (672 Euros) to productivity losses[38].

It is worth noting that, despite the increase in drug prices for COPD, costs have remained very stable, between 1,876 USD and 1,645 Euros/patient/year in both studies almost 15 years apart. It is likely that the higher cost of drugs is been offset by a decrease in hospital costs, due to a greater effectiveness of

various treatments for COPD. If we use the most recent study, we can calculate an overall COPD cost of 36.2 million Euros for Extremadura in 2015, which extrapolated to the remaining Spanish population adds up to a COPD global cost in Spain of 1,547 million Euros in 2015.

COPD costs in Spain are significantly lower than those observed in surrounding countries, due to the lower costs associated with health care in our country. Thus, in Germany, the average annual cost of a patient with COPD is 7,263 euros [39], and in Greece it has been calculated at 4,730 euros [40]. Of course, in North American countries the cost is significantly higher: in Canada, where it reaches an average of 8,600 Canadian dollars [41]. Again, these costs do not reflect differences in prevalence, severity or prognosis, but rather the lowest manpower cost in Spain.

Given these figures, we must ask ourselves: what is being done to prevent COPD? Likely, the answer is that there is no direct investment in preventing the COPD epidemic. The best option is prevention of smoking, and restrictive legislative measures have been a great step forward, which should translate into a reduction in the costs of COPD in the decades to come. Other alternatives are the prevention of exacerbations, and reductions in the progression of the disease with appropriate treatment, physical activity, and vaccination, among other interventions.

#### Conclusion:

**Estimates based on data from Extremadura (Spain), conclude that approximately € 3,000 per patient is the average annual cost of a patient with COPD in Spain. This adds up to an estimate of 1,547 million Euros cost in 2015 in Spain.**

**Question 6.- What are the main preventive measures for COPD? What is their effectiveness?**

#### Text:

COPD is caused primarily by inhalation of tobacco smoke and, to a much lesser extent, by inhalation of biomass smoke, a more frequent cause in developing countries. Tobacco use is particularly relevant in respiratory medicine, as it is also the leading cause of lung cancer. Tobacco use is a predisposing factor for respiratory infections including pneumococcal pneumonia, influenza and tuberculosis. People with the least education, those with the least purchasing power, those between the ages of 18 and 24, and those working in construction are the most likely smokers. There are currently more than one billion smokers in the world. Active and passive smoking is responsible for more than 6.3 million deaths annually, which represents 6.3% of the total burden of disease. The WHO goals are focused on reducing the demand and sale of tobacco in the world through educational strategies, policies and legislation [42].

Tobacco smoke contains an aerosol of particles including water, nicotine and thousands of chemical substances that are harmful to the human organism, by absorption of toxins and

by local toxicity in the lungs through chemical oxidants. Tobacco use is the cause of 80% of COPD, either emphysema or chronic bronchitis. The mechanisms causing COPD by tobacco are complex and include inflammation and direct lung damage by oxidative substances, increased elastase activity (proteins that act against elastins and connective tissue), and decreased antiprotease activity.

The most effective preventive measure against COPD is tobacco control and cessation. Of the total number of smokers, 70% acknowledge their intention to quit smoking, and approximately half try at least once a year. Spontaneously and individually, only 1% achieve effective quitting. With simple medical advice success reaches 3%. Minimum intervention programmes are effective in 5-10% of smokers, while more intensive treatments can be successful in 25-30%. Intensive treatments are not easy to implement, due to limited resources, although existing regulations recommend that all smokers attempting to quit smoking should have access to anti-tobacco drugs. The drugs approved to treat tobacco use are nicotine, bupropion and varenicline. In a few studies, all of these drugs have been shown to double cessation of tobacco use compared to placebo. Concomitant administration of nicotine (long- and short-duration) with bupropion or varenicline increases the effectiveness of the treatment.

The benefits of quitting smoking are evident at any age and include: decreased risk of cancer, decreased risk of acute myocardial infarction, decreased loss of lung function, and in pregnant women, decreased likelihood of giving birth to low birth weight infants. In general, patients who quit smoking may gain 10 kilos of weight, and this may be a reason for some patients not to stop smoking [43, 44].

#### Conclusion:

**The most effective preventive intervention against COPD is smoking cessation. Although 70% of smokers want to quit, and half try it once a year, only 1% quit successfully without any help; 3% achieve this only with simple medical advice, 5-10% with minimum interventions, and 25-30% after intensive treatments that include anti-smoking drugs.**

**Question 7.- How do aging and chronic diseases affect the lives of patients with COPD?**

#### Text:

Life expectancy in most countries has increased in recent years, although ageing is associated with an increase in chronic diseases and disability. We are witnessing what Fries called the Theory of Compression, as early as 1980 [45]. We live longer, but disability and aging are compressed in the last years of life. It is tantamount to saying that we age later and renders obsolete the classic definition of "old", applicable to anyone over 60 or 65 years of age.

Cohort studies carried out in nonagenarians, 10 years after their inclusion in the study, show that the nonagenarians of the most recent cohorts had longer life expectancy, less dis-

ability, less cognitive deterioration, and even less brain atrophy measured by magnetic resonance (physiologically the brain size decreases with age)[46]. Data from the "Global Burden of Disease Study" show that between 1990 and 2013, years lived without disability had increased in a manner similar to life expectancy [47].

When exploring old age and COPD, the first problem that arises is that in elderly patient's COPD is more difficult to diagnose, given the presence of comorbidities that can mimic similar symptoms (e.g. heart failure), or limit exercise capacity (e.g. peripheral vascular disease). In addition, patients sometimes mistakenly attribute dyspnea to a natural process associated with aging. Spirometric confirmation is also more difficult in the elderly, since 25% of them cannot perform quality spirometry, and the time required for its performance is longer. In this sense, devices that use the FEV1/FEV6 ratio may be useful, since the greatest difficulty in the elderly population is completing forced exhalation [48, 49].

Elderly people hospitalized for a COPD exacerbation have less spirometric severity, but more symptoms and more comorbidities [50]. Another important issue is the difficulty in correctly using inhalation devices, due to the impossibility of "doing the clamp", dyspraxia or insufficient inspiratory capacity. It is therefore essential to check its correct use, in many cases with the help of the caregiver. And in doubt, it is recommended to use devices that assure that the inhalation has been correct.

In the elderly, frailty is frequent, meant as a diminished functional reserve, which in case of presenting a complication can lead to disability. It is estimated that a hospitalization due to COPD causes a loss of 5% of the strength of the quadriceps, and that the time required to recover the ability to walk is greater than in young people [51]. Finally, the presence of several comorbidities that interact with each other is frequent in elderly persons, making it virtually impossible to identify a main condition, so that in many cases the use of the term multimorbidity is preferable to that of comorbidity.

#### Conclusion:

**Ageing and its related accumulation of diseases, makes diagnostic confirmation of COPD more difficult, because symptoms may be attributable to other diseases. Correct performance of spirometry tests is more difficult in this population.**

**Question 8.- How is a day in the life of a patient with advanced COPD? The vision of a patient.**

#### Text:

Life with COPD is complicated. With discipline, will, and external help you can aim to having a life like that of a healthy person, but not the same. Everything is much slower, and therefore everything must be very programmed. Portable oxygen therapy allows to make social life outside the home, but slowly and programmatically. And at the end of the day, a great deal of tiredness accumulates, and you must retire soon.

The main limitation is mobility. A lot of help is needed for many things, especially boarding vehicles, getting into elevators, etc. All movements must be programmed and knowing in advance the accessibility of the places you are going to visit. Another important limitation is the provision of oxygen, as the backpacks last 4 hours, and then you must go back home to recharge. We often stop going to events because of the difficulty in overcoming unforeseen events, but by planning we can do almost anything.

I am asked if the COPD is a stigmatized disease. Personally, I do not feel that way, but other patients may feel stigmatized. I have been with this disease for a long time, and I consider that the stigma disappears more and more, and that it has been diminishing in the last years. One aspect to be commented from the perspective of a patient is the frequency with which COPD patients feel misunderstood and try to "justify" their situation. Friends and relatives tend to think that we are comfortable, and that we do not do certain things because we do not want to.

#### Conclusion:

**The life of a COPD patient with advanced disease is limited by the lack of mobility, the need for portable oxygen therapy, and the slowing down of all activities. Activities of daily living must be highly programmed, unforeseen events are mishandled, and the patient often blames him/herself, and needs to justify.**

**Question 9.- How does COPD impact the affective, psychological, social, sexual and spiritual spheres of the patient? The psychologist's vision.**

#### Text:

Breathlessness is one of the most frightening experiences of any human being. The suffering that accompanies not being able to breathe, or doing so with difficulty, blocks and stops any activity [52]. A headache, as long as it is not incapacitating, or a toothache, allow us to continue with certain activities, but lack of air does not. There is no need to point out the impact this has on people, at all levels. Several studies quantify the presence of anxiety and depression in COPD patients [53]. The consequences of COPD are felt beyond physical problems: it is a disease that, because of its main symptom, affects the whole person. The emotional impact is undeniable, and these emotions vary from day to day. Precisely, being able to manage emotions, not blocking them, can make the patient manage better or worse, their day to day.

The patient's loss of autonomy leads to a feeling of global dependence and denial. He/she rejects all sorts of activities, even the most intimate ones, such as affective or sexual activities. It accompanies the sensation of failure, discouragement, hopelessness and sometimes even loss of meaning in life. This is what we would call "demoralization syndrome", while the main difference with depression would be anhedonia; a patient with depression is unable to enjoy anything.

On the one hand, COPD patients tends to isolate them-

selves from the general world, from family, and even from himself. Sometimes they identify with the oxygen concentrator and forgets his phobias and phobias. On the other hand, patients feel shame and guilt because they understand that certain unhealthy life habits, such as smoking, led them to this situation. Guilt is one of the most complex emotions to deal with, since it is related to "repair", something barely achievable in this situation.

All this, if not addressed from the beginning and as the disease progresses, inevitably means the loss of a sense of dignity as a person. Dignity, like demoralization and emotional distress (anxious-depressive pictures) configures one of the essential needs of the person: spirituality [54]. We understand spirituality as an intrapersonal dimension (sense of coherence), interpersonal (relationships with others and feeling of peace) and transpersonal (legacy, hope). The person with COPD often identifies more with the idea of "sick" than with the real idea that it is "he/she himself/herself".

The care of emotions of any person with COPD is the main preservative of dignity and, therefore, of quality of life.

#### Conclusion:

**Anxiety and depression are two common manifestations associated with COPD, conditioned by the loss of autonomy and dependence on many activities of daily living. The care of emotions, and their management, is the main way to preserve dignity and, therefore, quality of life.**

**Question 10.- How does the presence of a COPD patient impact the family? Vision of the non-professional caregiver.**

#### Text:

The caregiver is a fundamental pillar for patients with COPD. We will distinguish between health professionals and informal caregivers such as friends, family, neighbors, which in most cases are those who will provide care at home. This role is often underestimated, both in the literature and in many of the documents that deal with the disease. We can see how those patients who have a caregiver have a better tolerance to exercise, fewer readmissions, and better adherence to treatments, than those who live alone [55, 56]. Sometimes the caregiver's vision, especially when dealing with a close relative, is to be caring for a fragile person. This worry with what the patient may suffer has negative consequences for the patient due to the anxiety and fear that this may cause, leading to overprotection of the patient, and making him or her more dependent. Hence the importance of the education that health professionals must provide, not only to the patient, but also to caregivers.

Dyspnea is the main symptom of any COPD patient. And together with fatigue, cough and altered sleep patterns, limits physical activity and activities of daily living [57]. Overall, 57% of patients who suffer from dyspnea in their severe or very severe stages have morning symptoms which will prevent

them from showering or dressing autonomously [58]. This affects family life to the point of having to change habits, to live together as a couple, or to stop sharing activities, forcing the patient and the family to implement strategies to minimize the consequences of these symptoms. In patients of working age, these limitations may imply a change or interruption of their professional activity, with the socioeconomic consequences that this entails.

The caregiver is often responsible for medication and symptom management, will provide assistance in activities of daily living, and will provide physical and emotional support to the patient. This increased workload will affect the patient's social and working life, and the caregiver may experience anxiety, worry, fear for the future, loss of autonomy and social life, and finally depression. These symptoms tend to increase as the disease progresses. In the final stages of COPD, the fear that the patient may die with suffering becomes a cause of greater emotional stress. Caregivers often complain that the information, emotional treatment or support they have at home is insufficient [59]. Yet they are forced to constantly adjust their role, with reconsideration of their needs.

But caring can also be positive and rewarding and teaching the caregiver how strong he or she can become is essential [60]. Hence the importance for health professionals to care for and accompany the caregiver during this journey, and later in the process of adjusting to the loss of care during the bereavement phase [61].

#### Conclusion:

**COPD patients with caregivers have better exercise tolerance, fewer readmissions, and better adherence to treatments than those without caregivers. Caring for, teaching and supporting the caregiver on their endeavors is an essential responsibility of health-care workers**

#### Question 11.- What is the role of nursing in COPD?

##### Text:

The role of nursing in COPD is fundamental in aspects such as health education, and for the implantation of healthy habits, with the aim to improving/maintaining the patient's quality of life [1, 23]. Education and support should also be aimed to family and caregivers.

Nursing is directly responsible, among others, of the following activities:

- 1.- Revise treatment to clarify doubts and avoid mistakes.
- 2.- Revise inhalation technique.
- 3.- Training in the handling of inhalers, inhalation chambers, rescue inhalers and nebulizers.
- 4.- Evaluate change of inhalers.
- 5.- Check the correct use of chronic home oxygen, both fixed and portable, in terms of use, hours, liters, mode.
- 6.- Resolve doubts about non-invasive mechanical ventilation (NIV).

- 7.- Review the cleanliness of materials (inhalers, chambers, nasal goggles, humidifiers...).
- 8.- Check food and water intake.
- 9.- Revise physical activity and respiratory rehabilitation.
- 10.- Teach energy saving techniques.
- 11.- Encourage self-care.
- 12.- Control vaccination schedule.
- 13.- Program strategies for smoking cessation.
- 14.- Teach how to recognize and react whenever a COPD exacerbation occurs.
- 15.- Help to program and maintain leisure time.
- 16.- Help in the programming of trips and vacations.
- 17.- Serve as a liaison with the Social Worker.
- 18.- Development of learning and reinforcement workshops for the patient's caregivers.
- 19.- Support during the progression and worsening of the disease, and during the end of life.

#### Conclusion:

**The role of nursing is essential in the care of COPD patients. There is a direct responsibility for patient and caregiver's health education, and in the psychosocial support for both.**

#### Question 12.- Women and COPD. Does COPD choose gender or does gender choose COPD? Is COPD different in women?

##### Text:

COPD is characterized by a chronic, progressive and irreversible limitation to airflow associated with exposure to tobacco smoke and, to a lesser extent, to occupational and environmental inhalants or products derived from biomass combustion. In addition to exposure factors, there are other host-related factors, such as genetic susceptibility or abnormal lung development, that predispose individuals to develop the disease [62-64].

In Spain, data from the EPI-SCAN study concluded that COPD prevalence reached 10.2% (15.1% in males and 5.7% in females) [65] while, ten years later, preliminary results from EPI-SCAN II (unpublished) suggest that the prevalence of the disease rises, and its increase is more remarkable in females (9.5%) than in males (16.9%), with still a high rate of under-diagnosis.

In Spain, ageing of the population, more pronounced in women due to their greater longevity, and their massive incorporation into tobacco use around the 1970s, has led to an increase in respiratory diseases associated with smoking in women. The latest National Health Survey, published in 2017, indicates that while in men there is an annual decrease in smoking (18 percentage points since 1993), in women, there has been a phenomenon of maintenance with leveling off. However, with alarming trends among the youngest, where

girls already outnumber boys in tobacco use. In spite of this, COPD is still considered a disease that mainly affects men, which constitutes a diagnostic bias that contributes to the greater under-diagnosis in women in Spain [66, 67].

Female smokers are more susceptible than male to the harmful effects of tobacco, due to genetic, anatomical, and hormonal factors, and develop more severe and earlier-onset forms of COPD [68-70].

In published studies, women refer a greater degree of dyspnea than men for the same degree of airflow obstruction, and lower tobacco exposure [71, 72]. However, women present comparatively lower sputum production than men, which may be influenced by social factors [73]. Nutritional status, a fundamental clinical parameter to be evaluated in patients with COPD due to its potential as a prognostic predictor, seems to be altered more frequently in women [74, 75], who also present more COPD exacerbations than men [76, 77], although with lower rates of re-hospitalization and better survival [78].

Regarding comorbidities, or diseases that are associated with COPD throughout its progression and interfere with the health status and prognosis of these patients, their expression is also different by sex. Data from the ECLIPSE study Agusti, [79], indicate that cardiovascular diseases are less prevalent in women with COPD, while disorders of the affective sphere are more frequent than in men. The presence of anxiety and depression in COPD-affected women has an important impact on the disease, both because of its influence on symptom control and quality of life, and because of its relationship with prognosis, since it is associated with a greater risk of exacerbation, longer hospital stays, persistence of tobacco consumption, less physical activity, greater mortality and, possibly, less adherence to treatment [73]. Osteoporosis, with a prevalence close to 35%, also predominantly affects women, especially in post-menopause, and correlates with more severe forms of COPD and a low nutritional status [78].

In terms of treatment, published studies show that women tend to stop smoking less frequently, and that their success rate in long-term smoking cessation is lower than that of men [80, 81]. Finally, in home oxygen therapy or respiratory rehabilitation, few studies have been designed to evaluate their efficacy according to sex, so the available information is scarce and even contradictory.

For all these reasons, COPD constitutes a growing health problem, especially in women. Priority should be given to improving clinical suspicion and clinical characterization, to optimize the therapeutic approach in female COPD patients.

#### **Conclusion:**

**COPD is a growing health problem, especially in women. Priority should be given to improving clinical suspicion and clinical characterization to optimize the therapeutic approach in these patients.**

**Question 13. What does the media know and what does the specialized and non-specialized press publish on COPD? What does the "World COPD Day" represent?**

There is a disproportion between the impact of COPD on public health and its presence in the general media. If we assess *La Vanguardia*, over a period of two years as a case study (October 2016-September 2018), we observe that COPD has been cited in 14 articles, in one of which it has appeared in the headline ("An Everest for patients with COPD", by Rosa M. Bosch, 6/4/2017). If we extend the sample to chronic bronchitis and emphysema, it has been cited in a total of 18 articles. Although it is the third cause of death in the world according to the WHO, it is not the third disease with more presence in *La Vanguardia*.

To understand the reasons of this discrepancy, it is instructive to look at the coverage of other diseases with the greatest mortality impact: ischemic heart disease (9.4 million deaths in 2016; cited in 131 articles; 28 headlines); stroke (5.8 million; 101; 18); cancers (9.6 million; 584; 198); Alzheimer's and other dementias (1.9; 122; 44); diabetes (1.6 million; 148; 17); diarrhoeal diseases (1.4 million; 33; 4); tuberculosis (1.3 million; 71; 8); AIDS (970,000; 201; 63); malaria (470,000; 51; 11) [82]. These data show that there is no direct linear relationship between the epidemiological impact of a disease in terms of mortality, and its presence in the media. Should we analyze those diseases not with the highest mortality, but the most disabling ones, such as depression or chronic back pain, a similar pattern emerges.

In order to understand the criteria on which a disease has more or less presence in the media, it is convenient to identify commonalities with those conditions most frequently reported (cancer, AIDS) and differences with those that are less covered (COPD, diarrheal diseases). This analysis reveals different variables with different relative weights. The two variables that have more weight are, on the one hand, the appearance of novel and relevant medical information associated with the disease and, on the other hand, the fact that a disease is associated with well-known public people.

Cancer and AIDS are examples of diseases that meet both requirements. At the other extreme, diarrheal diseases and COPD do not meet either of the two for the Spanish media.

All of the above diseases have a World Day on the calendar, indicating that the variability in information coverage between them does not depend on having a World Day or not.

An additional handicap of COPD is in its name, which is unfamiliar to large sections of the population. A similar handicap has affected in recent decades stroke, which displaced terms that are better known among the population, such as embolism or apoplexy. In the same way that stroke has become an everyday word, it is to be hoped that COPD will also do so in the future.

#### **Conclusion:**

**There is no direct relationship between the frequency of a disease as a cause of death, and its media coverage. The diseases most frequently cited in media are those in which either the most "novel" medical information is**

produced, or in which celebrities are involved. Having a World Day is not a factor of relevance.

**Question 14.- What are the current strategies for COPD? What are the alternative solutions to improve their quality and effectiveness?**

**Text:**

The National Strategy Against COPD has had, so far, a positive impact. However, there is a lack of resources (human and economic), a lack of quality spirometries and proactive diagnosis, deficient computer systems, great variability in care, low adherence to Clinical Practice Guidelines, deficient training in self-care, deficient care coordination, and far too high rates of readmissions.

In relation to COPD, the National Health System (SNS) in Spain confronts an increase in chronicity, a greater demand for care, a growth in technological complexity and an increase in dependence, and the need for social health care. These are all important elements for a "perfect storm". To them it must be added the deep economic and social crisis, and an unsustainable model of health and social protection. Should there be no reforms a crisis of the system is envisaged.

The most relevant factor is demographic ageing. The population aged 65 years and older would account for 25.2% of the total in 2033 [83]. The coincidence in time of a formidable increase in the population to be treated, aged and multi-morbid, consuming enormous health resources, in a context of health budgets with little annual variation and very tight (downwards) to changes of GDP is "the perfect storm" [84]. There is no ongoing reform of the NHS, to achieve long-term sustainability and to avoid future recessions [85].

To overcome this storm, *"we must be ready to reorganize the health system with new policies, plans, and programs, and be willing to convince decision-makers that only by acting on three pillars - patient-centered care, hospital efficiency, and carrying out interventions in the optimal (home) environment - can we avoid disaster"* [84].

The Spanish NHS needs strategic management of future crises, identifying trends and anticipating solutions before it is too late [86]. If the urgent displaces the important, it prevents us from facing any long-term challenges. It is the "curse of short-termism" that takes away our time for reflection, without the capacity to adapt and anticipate. Reforms and changes are delayed "sine die" [87].

We need quality information on the impacts of current decisions and their alternatives, with appropriate measurement instruments and a multi-system thinking approach [88]. There are no simple solutions to complex problems. We obtain an enormous amount of data which, if well analyzed and shared, should enable the implementation of public policies backed by objective data [89]. We should avoid unfounded or improvised policies that are never evaluated. Some alternatives might be:

- A more efficient, flexible, modern, professional and independent organizational structure.

- A strong political and institutional support, (i.e.: clear, public and transparent), with a guaranteed budget.
- Involvement of patients in decision-making (information and education) and in increasing home treatment.
- Improve coordination with the Autonomous Regions.
- Integrated and compatible clinical history.
- Comprehensive care process (PAI) with exacerbated COPD, avoiding re-entries [90].
- Respiratory rehabilitation, palliative care, control and treatment.
- Effectiveness against smoking.
- Innovate, go to a results-based model (ICHOM). Behavioral economics [91], digitization, and big data.

**Conclusion:**

**The current conditions in the approach to COPD of the National Health System favor "the perfect storm". The ageing of the population and the increase of the necessary resources require a serene and long-term planning that seems incompatible with the management of "the urgent".**

**Question 15. COPD beyond tobacco.**

**Text:**

COPD has, traditionally, been considered as a self-inflicted disease due to tobacco use [92]. Thus, in some genetically susceptible individuals, inhalation of tobacco smoke produces an excessive inflammatory response [93] which, in turn, causes accelerated loss of lung function with age [92]. Subsequently, it was recognized that inhalation of other particles and gases, such as those derived from the combustion of biomass for domestic use, was also a significant COPD risk factor, especially in developing countries [94, 95]. And, even more recently, it has been proven that alterations in pulmonary development, during pregnancy and after childbirth, due to genetic and/or environmental causes, are also an important risk factor for COPD [96]. In fact, approximately half of patients diagnosed with COPD in clinical practice, often in their fifth or sixth decade of life, already had evidence of poor lung development by the age of 30 [97]. It has also been shown that poor lung development is associated with poor development of other organs (cardiovascular, metabolic) resulting in a higher prevalence and incidence of co-morbidities at early ages, and higher mortality [98]. The observation that COPD goes beyond tobacco opens new opportunities for its prevention and treatment [99].

**Conclusion:**

**Tobacco use remains the main risk factor of COPD. However, it is not the only one. Inhalation of gases other than those produced by tobacco is also a cause of COPD. In addition, very recent research indicates that poor lung development before or after childbirth may also contribute to the pathogenesis of COPD (and other chronic diseases) in adulthood, opening new opportunities to**

**implement much earlier prophylactic and/or therapeutic measures.**

**Question 16.- What do Clinical Practice Guidelines contribute? How should the Guidelines of the future be?**

**Text:**

Clinical practice guidelines (CPGs) aim to improve the quality of health care and reduce variability in the treatment of patients. CPGs make treatment recommendations based on available evidence and, when evidence is not available, based on expert opinion. In recent years GPCs have evolved towards a greater recognition of the imperative need for a systematic approach to evidence and a very rigorous manufacturing process to ensure that only accurate and appropriate recommendations are issued. The use of methodologies such as GRADE (Grading of Recommendations Assessment, Development and Evaluation) allows for the elaboration of recommendations that are robust and as free of bias as possible [100]. However, the use of this methodology implies a very high cost in time and money and limits the application of the guide to a series of previously defined assumptions in the form of PICO questions (patients, intervention, comparison, outcomes). This fact, together with the difficult interpretation by clinicians of the results of the GRADE system, has implied that various scientific societies have tried to find ways to improve and/or simplify the elaboration of GPCs without losing reliability. For example, the American College of Chest Physicians has initiated what they call a hybrid process, that includes recommendations based on evidence according to the GRADE system; and when the evidence is insufficient, they combine it with a Delphi process to reach a consensus that results in reliable positioning [101]. To this end, they have developed a structured process that includes a systematic review of the literature and very strict rules on expert participation and voting [101].

The American Thoracic Society (ATS) is developing the CORE (Convergence of Opinion on Recommendations and Evidence) process, which aims to discriminate at the beginning of the development of the GPC those recommendations that should be developed through a systematic review of the literature and those that can be based on expert opinion. The CORE is a type of modified Delphi, which in a study showed that it offers very similar results to the GRADE process in many recommendations, which would in many cases allow recommendations to be formulated with great savings in time and resources [102].

The European Respiratory Society (ERS) has initiated a mixed process in the development of GPCs that includes the formulation of PICO questions, and a systematic review with recommendations according to the GRADE system, but together with non-PICO questions in aspects where there is no evidence and that will generate recommendations based always on the EtD (Evidence to Decision) process [103] to explain in a clear and transparent way, what type of information has been used to establish the recommendation [104].

In any case, the challenge for future GPCs is to develop evidence-based recommendations, free from bias and useful to the clinician [105].

In Spain there is the Spanish COPD Guide (Gesepoc) led by the Spanish Society of Pneumology and Thoracic Surgery (SEPAR). It is conducted in collaboration with all the scientific societies involved in the care of COPD patients, plus patient associations. Its first edition was published in 2012, and its latest revision in 2017 [106]. It is a GPC that uses the GRADE system of evidence evaluation, and has had a progressive implementation, so that in 2016, 46% of the clinical charts of patients with COPD audited in Spain included the classification according to the Gesepoc guide.

**Conclusion:**

**Clinical Practice Guidelines offer a series of recommendations based on scientific evidence. CPGs are not without methodological problems and difficulties, but compliance improves clinical outcomes and patients' quality of life.**

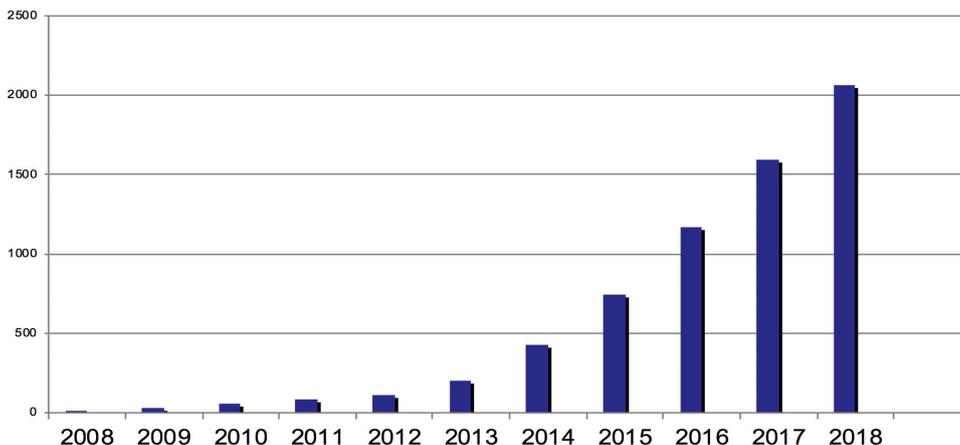
**Question 17.- What is the CIBERES (Centro de Investigación Biomédica en Red en Enfermedades Respiratorias)? What has been the contribution of CIBERES to the management of COPD in Spain?**

**Text:**

A few years ago, the Spanish Government decided to create specific research institutes and created the CNIC (National Centre for Cardiological Research) or the CNIO (National Centre for Oncological Research) on the grounds of the "Carlos III Institute". Each had a separate building, that was filled with researchers, and hired star directors with the aim of promoting research excellence in oncology and cardiology, two important pillars of a society's health.

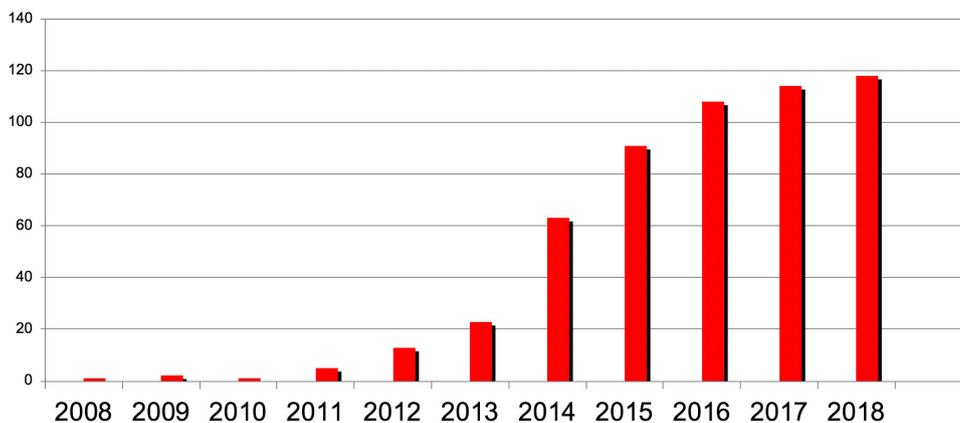
Over time, maintaining the building and that structure has a fixed cost, which limits the return on investment. Some twelve years ago, other models of research centers were chosen, which are the CIBER (Centers for Biomedical Research Networks). In these CIBERs there are no buildings (networked centers), and what they do is to put in communication the existing teams and groups of excellence of each of the areas of knowledge. They are provided with a non-physical structure and are assigned a budget to manage it for the same purpose they had for the CNIC or the CNIO.

What do we gain from this? We gain that we no longer have permanent staff researching in a building, but we have the best of the country, working together in each of their specific areas, working cooperatively and avoiding the cost associated with the structure. Each Euro invested is much more efficient and generates much more knowledge. Another advantage is that the structure is not fixed and permanent, so that the groups that make up the CIBER do not have the right to remain indefinitely. After yearly evaluations, the "worse" of those are excluded, and other groups can apply and be included.



**PubMed: CIBERES (Affiliation) AND, Spain (Affiliation) AND Year of Publication +/- COPD OR EPOC (Any Field)**

**Figure 1** | Progress of the overall scientific production of CIBERES followed through PubMed.



**Figure 2** | Progress of the scientific production in COPD, of CIBERES (number of publications indexed per year)

At CIBERES there are, nowadays, 34 research groups with different areas of interest in respiratory diseases. They represent the excellence of research in respiratory medicine in our country. That network has a scientific director, a management support structure, a management committee, and some internal and external scientific advisory committees, along with a minimal management structure that is physically in the Carlos III Institute in Madrid.

An annual budget of around 2.7 million Euros is received, and that money is distributed among groups that make up CI-

BERES, not equally, but according to the annual evaluation of each of the groups.

To evaluate the scientific contribution of CIBERES since 2008, we have carried out a search in PUBMED according to the following criteria: CIBERES (Affiliation) + Spain (Affiliation) + Year of Publication +/- COPD OR EPOC. With these criteria, we offer the evolution, in number of global publications and particularly referring to COPD produced by the network. The graphs (figures 1 and 2) are worth more than a thousand words and demonstrate the spectacular the impact of the

money invested in this research group in top-quality scientific production. We have not included the formative impact on new researchers, nor do we have any record of the impact all this has had on improving people's quality of life, but we do not doubt this relationship.

**Conclusion:**

**CIBERES is a state organization for research in respiratory medicine. It brings together 34 multidisciplinary research groups. CIBERES, with 10 years in operation to date, has contributed to a better knowledge and management of COPD, with an extraordinary scientific production, and the training of countless Spanish researchers in this field.**

**Question 18.- What is the current paradigm of COPD? Could we speculate on the future of COPD for the year 2050?**

**Text:**

Along the XXth Century, COPD was a disease associated with the triad of man, smoker, and older than 65 years. The current paradigm is changing and is that of a chronic disease associated with aging and smoking, requiring comprehensive treatment by specialists in Pneumology, but also Nursing, Primary Care and Internal Medicine. COPD is becoming feminized, and in the United States more women than men die with this disease. In Spain, it is estimated that in 2017 more than 28,000 people died with COPD, that is 17,300 men and 11,400 women. In addition, COPD is detected earlier, and patients live longer, so that the age of diagnosis, which before was usually between 65 and 69 years, now has a much wider range [11]. In the medium-term future, say in 2050, the burden of COPD could be reduced by reducing environmental pollution and controlling smoking (106). Tobacco use rates remain high in many developing countries and some developed countries, and indoor and outdoor pollution and occupational exposures are still serious problems in many countries. But the greatest current determinant of COPD is age. As life expectancy increases, and the ageing population increases, the burden of COPD can be expected to increase.

It is likely that promoting the development of better medical care, using newer and more effective drugs for COPD, and their increased adherence, will reduce disease-related mortality; thus, new cases of COPD will exceed the number of deaths caused by it, resulting in an increased burden of COPD.

Finally, it should be noted that the prevalence of COPD or airflow obstruction is more frequent in areas with a high prevalence of cigarette use. However, although it may seem a population paradox, COPD mortality is more closely related to the prevalence of low forced vital capacity (FVC) which, in turn, is more associated with poverty than with smoking [107, 108]. In 2050 there will be more people dying with COPD than from COPD; but since 2015, it is the third cause of death in the world, and the fourth in Spain.

**Conclusion:**

**The current paradigm of COPD as a disease involving**

**smokers, men, and those older than 65 years of age is changing rapidly. In the United States, more women than men die with COPD. The situation in 2050 is difficult to predict and will depend not only on factors such as trends in smoking, but also on changes in poverty and longevity.**

**Question 19.- What are the main objectives of patient associations? What should they change?**

**Text:**

The WHO in 2008 wrote a report which showed that patient participation in their own processes can improve health outcomes, patient satisfaction, and even be economically beneficial [109]. In order to achieve these objectives, patients must join forces and associate. Patient Associations can play a fundamental role, being an important intersection between Public Health, health systems, health administrations, professionals, and society.

From a critical point of view, there are more than 6,000 patient associations in Spain; probably there are too many. They have very different levels of organization, development and action, and although there is a progressive improvement, it can be said that, in general, there is a lack of training, structure and leadership. There are, however, some well-structured and consolidated associations and federations.

Patient Associations can play a fundamental role, being a relevant intersection between Public Health, health systems, health administrations, professionals and society.

With a surge of patient associations [110, 111], the health system appears as a complex entity, with national, regional and local levels and with communication problems in all of them. There are problems of access to innovation, and inequalities in access to benefits, especially new therapies.

In our opinion, the main weaknesses of patient associations in Spain are:

- Scarce number of associates. Only 3% of patients belong to an association.
- Scarce economic resources. Subsidies are very scarce, and it is difficult to find resources from other sources.
- Physical limitations caused mainly by the disease or the recovery process of the people involved in its operation.
- Limitations of administrative knowledge. It is almost impossible to have associates, with time and useful professions, to deal with all administrative, legal and management issues, often complex and requiring significant dedication and qualification.

In Spain, FENAER (Federación Española de Asociaciones de Pacientes Alérgicos y con Enfermedades Respiratorias) [112] tries to "be the voice of patients" with allergies, asthma, COPD and other risk factors, and participates actively in decisions affecting health.

**Conclusion:**

**Patient associations in Spain are probably exces-**

sive in number and deficient in number of associates, and need stronger structures, better funding and more knowledge of the health administration. Such changes would help them to exert the necessary impact that is expected from them.

**Question 20.- What is necessary to prepare and change the future of COPD in Spain? The view of health-care administrators.**

**Text:**

The National Health System (SNS) plans in Spain establishes the objectives and programming of activities of the public health administration. One of the objectives of the Quality Plan of the SNS is to improve care for the most prevalent diseases with the highest care, family, social and economic burden, including COPD [113] among them. It was in this context that the National SNS COPD Strategy was developed, which was divided into six strategic lines of action, one of which was research [114]. The general objectives of this strategic line were to promote epidemiological, basic, clinical and translational research, in aspects of prevention and comprehensive COPD care. The specific objectives were to establish priority lines of research, to promote, through their inclusion in calls for research projects, priority interdisciplinary lines of research in COPD, to implement measures to promote the creation of accredited networks of research centers and groups of excellence in COPD, and to promote research in primary care on COPD care.

The autonomous communities in Spain have also developed health plans. For example, in Catalonia the 2016-2020 Health Plan has selected nine priority areas of prevalent chronic health problems, one of which is respiratory diseases [115]. In addition, the Health Plan has also prioritized research and innovation through the development of the Strategic Plan for Research and Innovation in Health [116]. The thematic priorities of this Strategic Research Plan are aligned with those established in the Catalan Health Plan, and respiratory diseases have been included as one of the preferred topics.

On the other hand, there is also private promotional research that is developing new products based on the discovery of new therapeutic targets [117]. In approaching the incorporation of pharmacological research, it is necessary to anticipate and plan for access to future innovation. In this sense, an axis of work of the public health administration has been the creation of a "radar" or "horizon scanning" system of pharmacological innovation, to anticipate and plan access to it in the public health system [115]. Furthermore, it is necessary to evaluate the pharmacological innovations that are marketed in order to determine the added therapeutic value that they provide and to guarantee equity in access to these innovations in the field of public health, in accordance with the principles of effectiveness, safety, efficiency and sustainability of the public health system, as well as the conditions of use, access and provision.

**Conclusion:**

COPD is one of the main objectives of the national and regional health plans in Spain. The plans include several strategic lines, one of which is the promotion and stimulation of research. On the other hand, the public health administration also assesses the added therapeutic value of innovations, to ensure equitable access within the national health system.

**Question 21.- What reflections from the ethics perspective do we propose?**

**Text:**

COPD, as its name indicates, has chronicity as one of its main characteristics. The distinction between acute and chronic processes is as old as Western medicine itself. It is already found in the Hippocratic writings, those with which our medicine was born. On those writings, one of the main characteristics of chronic diseases, was the consideration that environmental factors had evident influence on them. On the contrary, acute diseases were not only characterized by their sudden and rapid appearance, but also because in them it was not possible, or at least it was not for the ancient doctors, to establish a close correlation between life habits and the genesis of the disease, something that was verifiable in the case of chronic diseases. In these, in fact, prolonged disorders in the diet or in any other aspect of life have an obvious nosogenic effect. This is the case of excessive eating or sedentarism in the development of diseases such as obesity or diabetes.

The case of COPD is particularly significant. Like most respiratory diseases, it is closely related to substances that are introduced into the lungs when breathing. In the specific case of COPD, with those coming from the use of tobacco. In other lung diseases, these are other products present in the atmosphere. This explains why many lung diseases are relatively modern and are linked to industrial development, the increase in fossil fuels, air pollution in cities, etc. The natural history of COPD has been associated with the introduction of tobacco in the habits of Western culture, after the discovery of America. The description of tobacco smoking given by the doctor and botanist Francisco Hernández in the notes of his scientific expedition to New Spain (1571-1577) is classic: *"the sense of sorrows and works is blunted, and it completely invades the spirit as a rest for all faculties, which could be called an almost inebriety"*. [118]. This made its use spread rapidly, although the greatest increase began in the late nineteenth century, because of mechanization and industrialization of both harvesting and marketing. In fact, mass consumption of tobacco has taken place in the twentieth century. The pioneering studies by Richard Doll and Bradford Hill [119-121] pointed out to the carcinogenic effect of tobacco smoking, that was verified even in the non-smoking wives of male smokers [122]. From then on, its worldwide consumption began to decrease.

The correlation between tobacco use and lung cancer is now evident, but not so of tobacco use and other lung diseases.

es. Moreover, there is a widespread belief that in those who do not develop cancer, tobacco use is harmless, so that almost all will end up suffering some form of lung disease, COPD, chronic respiratory failure, etc...

Chronic diseases have been considered since ancient times as "moral diseases". The moral adjective has here the etymological sense that the term possesses in Latin, of "habit" or "custom". They are called moral diseases because their appearance and development are closely linked to the disorders of life habits, or customs. According to a very ancient tradition, negative habits of life are called "vices", and their opposites are called "virtues". This is why we speak, for example, of the "vice of smoking".

Ancient medicine did not have great diagnostic or therapeutic means, but it did promote the development of healthy lifestyles in human beings. This explains the importance of "hygiene", especially "private" hygiene. A very significant characteristic of the medicine of the last two centuries is that the so-called "public hygiene" has developed spectacularly, but with a certain neglect of the "private hygiene". From medieval times until the end of the 18th century, this consisted of regulating the six factors included in what was known as the catalogue of "sex res non-natural" (six non-natural things): the environment, food and drink, movement and rest, sleep and wakefulness, excretions and secretions, and, finally, mood affections [123, 124].

Physicians tried to regulate these aspects of people's lives, their diet, physical exercise, rest, etc. It was a whole program of health education, which for cultural reasons has lost its millenary validity, so that certain chronic diseases due to poor diet, little physical exercise, use of toxic substances, pollution of the atmosphere and workplaces, etc., have grown exponentially. This explains why the great progress of medicine has been due to the better control of acute diseases, rather than to the success in the management of chronic diseases. Quite a paradox. The emergence of very efficient therapies and the attention paid to public hygiene has led to the neglect of private hygiene, a fundamental aspect, if not the most important, of health education.

#### Conclusion:

**Attention should be drawn to the importance of health education in the field of chronic diseases. Many of them are the result of our cultural habits, which is why a new "health culture" needs to be promoted, in order to manage them properly. An objective of institutions such as the Health Sciences Foundation should be to contribute to the promotion of this new culture, through the elaboration of "Health Education Guides". In the same way that there are "Clinical Guides", aimed at professionals, there should be others that aim to educate the population in healthy lifestyle.**

#### CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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