

The Role of the Pulmonologist in the Assessment of Disability in Patients With Respiratory Disease

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A high percentage of the individuals who consult respiratory medicine specialists are working adults, and these patients often complain that dyspnea on exertion hinders their ability to do their job. In other cases, patients are referred for assessment by those responsible for evaluating disability. Furthermore, diagnosis of a respiratory disease should be accompanied by a therapeutic regimen which, in addition to pharmacotherapy, should include advice on lifestyle, nutrition, and physical exercise and recommendations on the kind of work the patient can undertake. Pulmonologists are therefore heavily involved in the assessment of disability in patients with respiratory diseases.

The aim of this review is to offer respiratory specialists a broad view of the medical and legal procedures used to evaluate functional impairment caused by respiratory disease, and suggest how they can make recommendations to these patients concerning the appropriate working conditions for the prevention and treatment of their disease.

Key words: *Disability assessment. Evaluation of respiratory impairment. Respiratory diseases. Lung function tests. Respiratory medicine.*

Participación del neumólogo en la evaluación de la capacidad laboral de personas con enfermedades respiratorias

Una gran proporción de los individuos que acuden a las consultas de neumología son adultos en situación laboral activa, y con frecuencia refieren disnea de esfuerzo que les dificulta el desempeño de su trabajo. En otras ocasiones los pacientes son remitidos por las unidades de valoración de incapacidades para solicitar un informe acerca de su enfermedad. Si a esto añadimos que el diagnóstico de una enfermedad respiratoria debe acompañarse de unas prescripciones terapéuticas que, además de fármacos, incluyan recomendaciones sobre los hábitos de vida, nutrición, ejercicio físico y actividad laboral, hay sobradas razones para que el neumólogo se implique en la evaluación de la capacidad laboral de los pacientes con enfermedades respiratorias.

El objetivo de esta revisión es ofrecer al neumólogo una visión amplia de los procedimientos médico-legales que permiten evaluar el menoscabo funcional provocado por la enfermedad respiratoria, así como recomendar al paciente unas condiciones laborales adecuadas para la prevención y el tratamiento de su enfermedad.

Palabras clave: *Evaluación de incapacidad laboral. Evaluación del daño respiratorio. Enfermedades respiratorias. Pruebas de función pulmonar. Neumología.*

Introduction

Respiratory diseases may result in a deterioration of lung function that affects the patient's ability to carry out normal work activities. These diseases may also be occupational in origin, a result of inhalation of substances

present in the working environment.^{1,2} Most industrially developed countries have compensation systems that protect workers who develop occupational disease by providing financial support to cover loss of income due to work-related ill health. In Spain, this benefit is paid by the national social security agency, a body called the Instituto Nacional de la Seguridad Social (INSS).³ An understanding of the terms used in this field is essential to the proper evaluation of the respiratory patient's disability. The term disability refers to a person's partial or total inability to carry out his or her job properly for health reasons. It relates to the effect of the physical impairment or disease on the individual's daily life and is a medicolegal term. Disability is determined and certified by an examining

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board, and certification entitles the individual to financial support. The Spanish terms *incapacidad laboral* and *invalidéz* are equivalent to the English term disability. Impairment, on the other hand, refers to any loss or abnormality of psychologic, physiologic, or anatomic structure or function. Impairment is a strictly medical term, and the degree of impairment is determined objectively by a specialist physician. On the basis of this assessment and other factors, the patient's disability status is subsequently determined by a medicolegal examining board.

The Need to Evaluate and Compensate for Functional Limitations

Article 41 of the Spanish Constitution provides for the right of all citizens to a public system of social security to be regulated according to the provisions of the Social Security Act (*Ley General de la Seguridad Social*).² Coverage includes health care and rehabilitation as well as disability insurance for persons unable to work as a result of either occupational or nonoccupational disease. The system is based on the principles of universal coverage and access, equality, and social solidarity.

The provision of financial assistance to persons unable to work is a benefit that protects the individual and allows them to take care of their health, which may be severely affected. From the standpoint of public health, the fact that workers continue to be paid when they are sick means that they are more likely to consult a physician, and this in turn ensures early diagnosis of the disease and ultimately greater safety in the workplace. Early detection of occupational disease serves as a warning signal that leads to improved prevention among other workers exposed to the same or similar risks.

The worker who is awarded permanent disability receives a compensatory lump sum payment or a disability pension for life. The amount paid varies on a case-by-case basis and depends on the severity and cause of the disease responsible for the impairment. Each case requires careful assessment because, as described below, the types of disability benefit awarded differ significantly.

Temporary disability benefit is assessed and certified by either the worker's family physician or, in the case of occupational disease or workplace injury, the health insurance physician. The maximum benefit period for temporary disability is 12 months, and benefit is terminated when the recipient is considered well enough to return to work. If the patient has not recovered within 12 months, the case is transferred to the INSS. This agency can then take 1 of 3 steps: *a*) extend temporary benefit for a further 6 months, *b*) award permanent disability, or *c*) terminate temporary disability benefit on the basis of a medical assessment.⁴

Permanent disability is awarded to workers whose functional limitations continue to reduce their work capacity even after appropriate treatment. The disability level is determined according to how much the beneficiary's functional impairment limits their ability to perform their usual work or prevents them from undertaking gainful employment of any kind.

Classification of Permanent Disability

1. *Permanent partial disability.* Permanent partial disability is defined as a reduction of 33% or more in the normal performance of the tasks associated with the person's current profession. The worker is, however, still able to perform the basic tasks essential to his or her job.

2. *Total and permanent disability.* Total and permanent disability is defined as the inability to perform the basic tasks associated with the worker's current profession, even though he or she may be capable of performing less physically demanding work or working in an environment where there is no risk of exposure to specific agents. The age of the worker influences the amount of the benefit received.

3. *Absolute permanent disability.* Absolute permanent disability is defined as the inability to do any kind of gainful employment.

4. *Major disability.* Major disability is defined as absolute permanent disability in an individual who also requires the assistance of another person in order to perform the necessary activities of daily living.

People eligible for the types of disability listed above are entitled to the following types of benefit payment, all of which are calculated on the basis of a base pension (*base reguladora*), which is a reference monthly remuneration derived from the individual's earnings and social security contribution level.

– In the case of permanent partial disability, the beneficiary receives a single compensation payment equivalent to 2 years of the base pension (24 months)

– In the case of total and permanent disability, the beneficiary receives a lifetime monthly benefit payment equivalent to 55% of the base pension and is permitted to work in another job in which his or her impairment is not a limitation. This payment may be increased by 20% after the age of 55 since it is presumed that people will encounter greater difficulties finding work outside of their usual profession at this age

– In the case of absolute permanent disability, the monthly benefit paid is equivalent to 100% of the base pension

TABLE 1
Cause-Dependent Differences in Disability Benefit

Characteristics	Occupational Disease	Nonoccupational Disease
Minimum contribution	None	>14 years
Currently paying social security contributions	Presumed	Essential
Medication	Free	40%-100%
Benefit level	75%-100%	>21 days 75%-100%
Absence of safety measures	Benefit increase: 30%-50%	No affect on benefit
Age at time of assessment	No limit	<65 years of age
Change of job	Possible	Not possible

– In the case of major disability, the benefit payment is equivalent to 150% of the base pension. This additional allowance of 50% over the amount paid for absolute permanent disability takes into account the need for a carer to assist the insured person

Permanent disability benefits in Spain also differ depending on whether the cause of disability is occupational or not. Nonoccupational contingencies include diseases and accidents unrelated to the individual's work, and occupational contingencies include occupational disease and accidents (Table 1). For example, a person over 65 years of age is not eligible for benefit if the cause is a nonoccupational disease or accident if they are eligible for a retirement pension. However, this is not the case when the cause of the disability is work-related. Moreover, the formula used to calculate the benefit payment on the basis of the base pension is more favorable to the worker if the cause of the disability is occupational.

Handicap

The concept of “*minusvalía*” (handicap) differs from that of disability. While the term disability refers to a person's capacity to work or do a job, the term handicap relates to the limitations a person experiences in the performance of the activities of daily living (Table 2). The level of an individual's handicap is assessed using standardized criteria according to fixed scales. In addition to functional limitations, assessment of a handicap takes into account social factors, family and work environment, educational level, and cultural background since these are all factors that may have a negative impact on the individual's social integration.⁵ It could be said that the award of handicapped status under the law represents official recognition that the person in question requires a higher level of support than most people. The rights and benefits conferred by this status are determined by a percentage rating of the handicap and include family benefits, noncontributory pension, and tax relief.

Eligibility Criteria for Permanent Disability Benefit

In order to be eligible for a permanent disability pension, the worker must fulfill the legislative requirements listed in Table 3. When a person not currently paying social security contributions develops a respiratory disease, they are only eligible for absolute permanent disability or major disability if they have at least 15 years of paid contributions, 3 of which must have been within the previous 10 years.⁶ Workers receiving a retirement pension are not eligible for permanent disability when the cause is a nonoccupational disease. However, the effects of an occupational illness may give rise to a disability award regardless of the patient's situation. The distinction between occupation and nonoccupational cause is therefore important because of the financial support the patient could be entitled to if their disease is occupational in origin.

TABLE 2
Differences Between Disability and Handicap

Characteristics	Disability	Handicapped Status
Eligibility	Working population	Entire population
Social security contributions	Necessary	Unnecessary
Social factors	Not considered	Taken into account
Amount of benefit paid	Unrelated to income	Income related
Assessment	No official scale exists, based on functional loss and employment	Official scale

TABLE 3
Eligibility Criteria for Permanent Disability Benefit

	Type of Disability	Nonoccupational Cause	Occupational Cause
<i>Total Disability</i>			
Social security status		Currently contributing	Not essential
Number of years of social security contribution		Age >26 years: 25% of the years elapsed since the subject reached 20 years of age, 20% of which must fall within the last 10 years Age <26 years: 50% of the years elapsed since the subject reached 20 years of age	No fixed minimum period
<i>Absolute and Major Disability</i>			
Social security status		Not essential	Not essential
Number of years of social security contribution		Age >26 years: 25% of the years elapsed since the subject reached 20 years of age, 20% of which must fall within the last 10 years Age <26 years: 50% of the years elapsed since the subject reached 20 years of age	No fixed minimum period

The Role of the Pulmonologist in the Assessment of Employment Disability

Determining whether an individual qualifies for disability and evaluating their level of functional limitation is a process involving both medical and legal aspects. The

object of the procedure is to assess the impact of the disease on the patient's well being and quality of life or, as specified in the recommendations of the World Health Organization, to determine their functional skills and limitations.⁷ In Spain, the INSS is the competent body responsible for evaluating each application, classifying the applicants' disability level, recognizing the right to disability benefit, and certifying disability status, as well as determining the cause of disability, and periodically reviewing cases. Clinical assessment of impairment plays a key role in characterizing and defining an individual's disability. For this reason, in the case of patients with respiratory disease, it is logical that the person who should assess the signs and symptoms of their condition should be a respiratory specialist.⁸ The assessment of functional impairment should be objective and based on standardized diagnostic tests. The aim is to characterize the severity of the disease and its impact on the activities of daily living. The request for an assessment may come from different parties (Table 4), and in the case of certain diseases a study of the occupational factors that may have caused the condition will be required.

Procedure for the Assessment of Disability in Respiratory Disease

- Phase I: assessment of functional and physical impairment. This is done by the respiratory specialist who must undertake the following steps: *a*) diagnose the disease; *b*) assess the patient's functional impairment; *c*) rate the probability of a causal or exacerbating relationship with the working environment; *d*) determine on the basis of the available data the impact of the disease on the individual's capacity to work; and *e*) inform the patient
- Phase II: drafting of a report on proposed disability status. This is compiled by the team responsible for evaluating the case
- Phase III: award of disability status. The provincial INSS office is the competent authority responsible for accepting or denying the application

Diagnosis of the Disease. Which Respiratory Diseases Can Be the Cause of Disability?

All chronic respiratory diseases that cause irreversible functional impairment even when appropriately managed and treated can give rise to permanent disability in a worker. The first step in the assessment process is to identify the disease, and it is the pulmonologist's task to establish a diagnosis in accordance with established medical practice.^{9,10} The impact of respiratory disease on employment has been investigated in several studies. Prevalent conditions, such as chronic obstructive pulmonary disease (COPD) and asthma, are common causes of disability and are associated with a shorter work life.^{11,12} Given the important socioeconomic and occupational implications of the certification of disability,¹³ physicians assessing benefit applicants are obliged to employ all available scientific knowledge, to use standardized lung function testing techniques, and to produce quantifiable and reproducible results that can be evaluated by third parties.

TABLE 4
Role of the Respiratory Specialist in the Process of Evaluating

Physician's decision as part of the therapeutic program
At the request of the worker wishing to apply for disability benefit
Assessment requested by the competent disability evaluation board
Assessment ordered by the court
As a consultant for the interested party in a court case
As a company consultant specializing in occupational disease

Classifying the Severity of Functional Impairment

Diagnosis of disease does not necessarily imply that the patient has a disability. The individual's functional reserve and the type of work they do are the primary determinants of whether or not they can continue in their usual employment. The combination of these variables gives rise to different situations. For example, although patients with mild COPD or well controlled asthma have a disease, they are still able to work if the job is not too physically demanding, whereas patients with treatment-resistant tuberculosis cannot work in certain jobs even though they may have completely normal lung function, and a professional diver with bullous emphysema and normal lung function may not be able to continue working in his or her profession because of the increased risk of pneumothorax. Therefore, after obtaining the results of the tests necessary to establish the most definitive diagnosis possible (chest radiograph, computed tomography, and bronchoscopy), the examining physician must also perform the tests required to assess the patient's respiratory function in an objective and reproducible way, ideally using simple procedures. Studies comparing symptoms with the results of objective lung function tests have revealed that the correlation is poor, and furthermore that this discrepancy is particularly marked in certain groups of patients applying for disability benefit.¹⁴ While imaging studies play an important role in diagnosis of disease, they are of little use in predicting the degree of functional impairment. The study of functional impairment secondary to respiratory disease is a specific and sequential process. The first step, which comprises spirometry and gas exchange analysis, may supply sufficient information for a final evaluation. These results are interpreted by comparing them with reference values from an asymptomatic healthy population.¹⁵

Spirometry is the test most commonly used to measure ventilatory capacity. The maneuvers required to measure forced vital capacity (FVC) and forced expiratory volume in 1 second (FEV₁) require the patient's cooperation. Current guidelines stipulate that spirometry should be performed by expert personnel, who must ensure that the subject clearly understands the procedure and is cooperating.¹⁶ Spirometry will identify an obstructive ventilatory defect, and when airflow limitation is present the test should be repeated after administration of a bronchodilator. Proper evaluation of a suspected restrictive ventilatory defect requires measurement of other lung volumes (total lung capacity and residual volume).¹⁷ Measurement of static lung volumes and inspiratory and

expiratory pressures help to establish the extent of respiratory involvement in cases of neuromuscular disease, obesity, and thoracic deformity. Other spirometric parameters, such as forced expiratory flow in the midexpiratory phase ($FEF_{25\%-75\%}$), and forced expiratory flow at 50% of FVC ($FEF_{50\%}$) are not considered useful tools for assessing lung function loss because they tend to be variable and depend on voluntary effort. When FEV_1 is normal, they should be used only for the purposes of a probabilistic risk assessment.¹⁸

The condition of the alveolar-capillary membrane can be evaluated by assessing diffusing capacity through the measurement of carbon monoxide transfer. Diffusing capacity depends on many factors and is affected by numerous diseases. It varies depending on the integrity of the alveolar surface (emphysema), the condition of the vascular bed (pulmonary hypertension and pulmonary embolism), the thickness of the interstitium (interstitial pulmonary fibrosis), and hemoglobin concentrations. Diffusing capacity is a variable sensitive to changes in gas exchange, but it does not discriminate between entities or provide any information about the etiology of the condition.^{14,19} In patients with diffuse interstitial lung disease, measurement of diffusing capacity is a key element in the assessment of the course of the disease and it correlates strongly with exercise capacity,²⁰ although it may also be affected by emphysema. This variable is not so useful in patients with obstructive lung disease. To ensure correct interpretation of the results, diffusing capacity tests, like spirometry, must be carried out in accordance with standard guidelines.²¹ In the case of respiratory conditions characterized by repeated

exacerbations or crises, disease severity should be assessed during the intervals between acute episodes, although the frequency, duration, and severity of such episodes must also be taken into account and well documented in the final evaluation.

In most diseases, the severity of the functional impairment can be assessed on the basis of the results of spirometry and diffusing capacity together with the symptoms reported by the patient using the severity scales recommended by various scientific societies (Figure 1).^{22,23}

The Possibility of the Workplace as Causative or Exacerbatory Factor

In some cases, the respiratory disease responsible for disability has been caused by specific agents present in the patient's workplace and is, therefore, deemed to be an occupational disease. When the condition is certified as occupational, the worker is entitled to a different type of permanent disability benefit, more favorable to the beneficiary. Respiratory specialists must obtain a detailed employment history for all patients, ascertain their profession and the different jobs they have held, question them about the intensity and duration of exposure to smoke, gases, dust, and toxic agents, and explore the relationship between their symptoms and workplace exposure. If any causal relationship between the worker's occupation and their disease is suspected, the specialist should order the necessary tests to establish this relationship with the highest possible degree of certainty. Detailed information about the working environment is also useful when evaluating the affect of work activities on the patient's disease. For

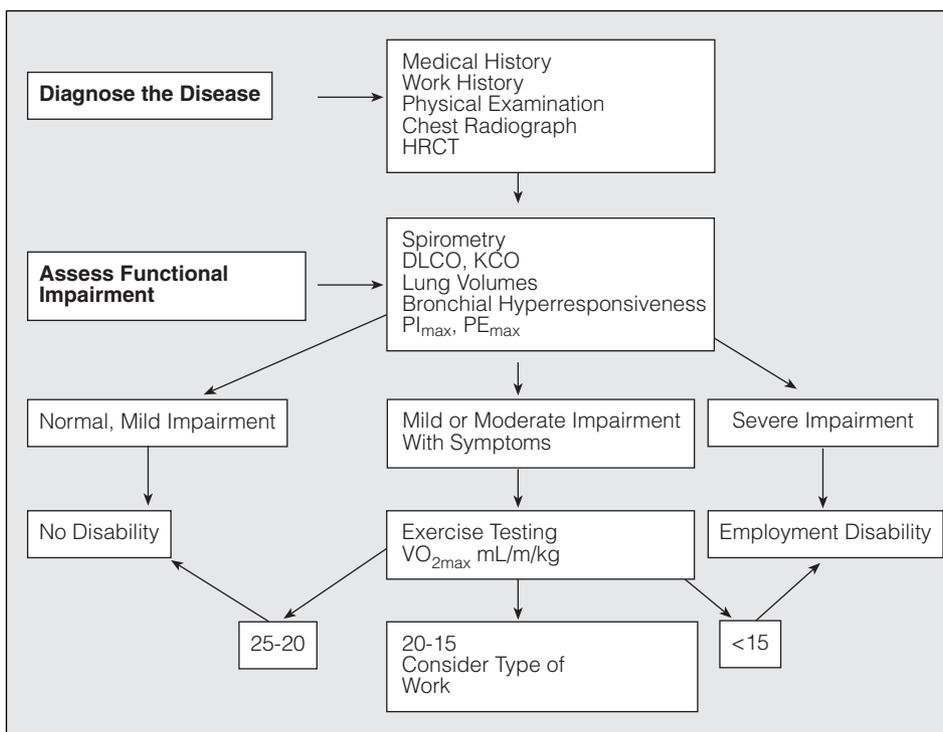


Figure 1. Schema for the assessment of functional impairment. DLCO indicates carbon monoxide diffusing capacity; FEV_1 , forced expiratory volume in 1 second; HRCT, high resolution computed tomography; KCO, carbon monoxide transfer coefficient; PE_{max} , maximal expiratory pressure; PI_{max} , maximal inspiratory pressure; VO_{2max} , maximum oxygen consumption.

example, a person with COPD cannot continue working in his or her usual job if the workplace environment carries the risk of exposure to agents, such as inorganic dust, associated with an increased risk of loss of lung function.²⁴ Another reason for determining whether the origin of the disease is occupational or not is that workers with work-related disease may be eligible for disability benefit even in the absence of permanent functional impairment. For example, a baker with occupational asthma who has become sensitized to the specific flours used in the workplace is disabled in terms of carrying out his or her usual work but does not have any functional impairment.²⁵ In Spain, the applicable legislation (*Real Decreto* 1299/2006) stipulates the list of occupational diseases covered by the social security system and lays down the regulatory framework for reporting and recording such diseases.²⁶

Assessing the Impact of Disease on Work Capacity

Strictly, the physician's role in the evaluation of permanent disability ends once a diagnosis has been established and the functional impairment caused by the disease has been determined. However, on the basis of the clinical findings and the work history obtained, the assessing physician will also be in a position to report on the impact of the disease on the patient's quality of life and well-being, an opinion that will be useful to the team responsible for evaluating the disability application. In most cases, a person's ability to do a job is determined by his or her exercise tolerance. Thus, the measurement of maximum oxygen consumption (VO_{2max}) during an exercise test is considered to be the gold standard for evaluating work capacity.²⁷ By measuring VO_{2max} , specialists can assess the cardiac, metabolic, and respiratory response of the organism. A normal response to exercise implies that all the functions of the respiratory apparatus (ventilation, gas exchange, neural control) are preserved and working together properly. Maximum exercise testing provides data on exercise tolerance and the factors limiting such tolerance. The monitoring of a number of additional variables (heart rate, blood pressure, electrocardiography, and PaO_2) during the exercise test will provide data of both diagnostic and prognostic value and is useful for assessing gas exchange impairment in interstitial disease, detecting exercise-induced bronchospasm, and identifying heart disease or deconditioning. However, because of the limited availability of facilities for exercise testing and the high burden on health care resources involved, the routine use of this modality for the evaluation of disability is not possible.²⁸ Resting lung function tests provide indirect data that can be used to evaluate exercise capacity and, in the absence of maximum exercise testing, would appear to be the most useful battery of tests with the greatest predictive value for exercise tolerance. Studies undertaken by Cotes et al²⁹ have been used as a reference to establish scales of respiratory disability on the basis of the results of spirometry and measurement of diffusing capacity. Several scientific associations (the American Medical Association,³⁰ the American Thoracic Society [ATS],^{31,32} and the British Thoracic Society³³) have published guidelines and recommendations for classifying disability on the basis

TABLE 5
Scales for the Classification
of Functional Impairment

American Medical Association ³⁰				
Impairment Class	Class I Normal	Class 2 10%-25%	Class 3 26%-50%	Class 4 51%-100%
FVC, % of predicted	>80	60-79	51-59	<50
FEV ₁ , % of predicted	>80	60-79	41-59	<40
DLCO, % of predicted	>70	60-79	41-59	<40
VO _{2max} , mL/kg/min	>25	20-25	15-20	<15
American Thoracic Society ³¹				
Impairment Work Capacity	None Complete	Mild Almost Complete	Moderate Partially Disabled	Severe Totally Disabled
FVC, % of predicted	>80	60-79	51-59	<50
FEV ₁ /FVC, %	>75	60-74	59-41	<41
FEV ₁ , % of predicted	>80	60-79	41-59	<40
DLCO, % of predicted	>80	60-79	41-59	<40
VO _{2max} , mL/kg/min	>25	15-25	<15	

Abbreviations: DLCO, carbon monoxide diffusing capacity; FEV₁, forced expiratory volume in the first second; FVC, forced vital capacity; VO_{2max}, maximum oxygen consumption.

of the severity of functional impairment (Table 5). Although these tools are used widely, they are nonetheless the subject of some debate. Criticisms are based on the low quality of the evidence supporting the recommendations (most of which are based on expert opinion) and the lack of internal consistency.³⁴ All of these guidelines concur in considering the results of spirometry and diffusing capacity sufficient for assessing most cases and in reserving the use of exercise testing for specific cases in which resting lung function results might underestimate impairment. The ATS proposes that exercise testing be used in individuals with normal spirometry and diffusion results and patients with a slight impairment who experience symptoms during work. Other authors have criticized the lack of any strong relationship between resting lung function and exercise test results,³⁵ and have recommended the use of exercise testing in the assessment of patients with mild-to-moderate COPD and when there is little or no correlation between symptoms and resting lung function.³⁶ Studies have also been undertaken to establish the energy demands of certain jobs.³⁷ Since direct measurement of oxygen consumption (VO_2) during work is difficult, most authors have measured the relationship between VO_2 and heart rate in the laboratory and then monitored the patient's heart rate during the working day to obtain indirect estimates of VO_2 . Using this method, it has been established that in most jobs the energy demand varies throughout the working day.³⁸ Supposing that a worker is able to maintain a rhythm of 40% to 60% of his or her maximum VO_2 throughout almost the entire work day, measurement of this parameter could be a useful criteria for establishing whether or not an individual is capable of carrying out a particular job. More recent studies propose calculating VO_2 from the results of the 6-minute walk test, a safe and easy test of submaximal exercise capacity. The distance covered in 6 minutes—a variable directly and significantly related to the capacity to perform various routine daily activities—has been shown

TABLE 6
Criteria in Spain for the Assessment of Disability⁴

Assessment	Diagnosis	Functional Impairment	Reduced Work Capacity	
Medical history, risk factors, physical examination, spirometry, diffusing capacity, VO _{2max} , HRCT, bronchoscopy, etc	COPD Interstitial lung disease Restrictive ventilatory defects	Mild	For jobs with high energy demands For moderately physically demanding jobs For work of any kind	
		FVC, % of predicted		60-79
		FEV ₁ /FVC, %		60-74
		FEV ₁ , % of predicted		60-79
		DLCO, % of predicted		60-79
		VO _{2max} , mL/kg/min		20-25
		Moderate		
		FVC, % of predicted		51-59
		FEV ₁ /FVC, %		59-41
		FEV ₁ , % of predicted		41-59
		DLCO, % of predicted		41-59
		VO _{2max} (mL/kg/min)		20-15
		Severe		
		FVC, % of predicted		<51
		FEV ₁ /FVC, %		<41
FEV ₁ , % of predicted	<41			
DLCO, % of predicted	<41			
VO _{2max} , mL/kg/min	<15			

Abbreviations: COPD, chronic obstructive pulmonary disease; DLCO, carbon monoxide diffusing capacity; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; HRCT, high resolution computed tomography; VO_{2max}, maximum oxygen consumption.

to have prognostic value in several diseases (including COPD and pulmonary hypertension) and may perhaps be useful in assessing the impact of COPD on work capacity.³⁹

Spanish legislation (*Real Decreto* 1971/1999) specifies the criteria for assessing disability attributed to respiratory diseases that cause loss of lung function on the basis of the results of spirometry, diffusing capacity, arterial blood gas analysis, and VO_{2max} (Table 6).⁴

Informing the Patient

Respiratory specialists who treat workers with a chronic respiratory disease should investigate the patient's occupational circumstances and work environment, and—taking into account the type of disease and level of impairment—should advise their patients about the impact of their job on the course of the illness and inform them of the possible causal relationship between their disease and workplace exposure. With the worker's consent, the specialist should even, in some cases, initiate the permanent disability application procedure. However, respiratory specialists should make it clear to patients that their role in the process is limited to clinical assessment and that the ultimate responsibility for awarding benefit lies with the competent authority, which in Spain is the INSS. In other cases, the respiratory specialist assessing the case is not the patient's usual physician (that is, no prior patient-doctor relationship exists) and has played no therapeutic role; the consultation may even be the result of a request by one of the parties in a court case. The specialist should avoid bias in the assessment and should make it clear that his or her opinion is the result of an objective examination. The medical report should specify the diagnosis of the disease, and the patient's functional status and therapeutic needs, as well as recommendations on lifestyle and the need for regular checkups. If requested by the patient or the examining board evaluating the application for disability benefit, physicians

may state their opinion based on the objective facts regarding the subject's ability to carry out a particular job or the likelihood that the disease was caused by their work.

Special Situations in the Assessment of Physical Impairment and Disability

In certain diseases, physical impairment and disability are not defined by a permanent loss of function, and in such cases proper assessment can only be made taking other variables into account.

Asthma

Asthma is an inflammatory disease characterized by variable and reversible functional impairment. Clinical guidelines for the diagnosis and management of this disease assess severity on the basis of clinical and functional variables and the patient's need for medication.³² The ATS proposes the use of a point scale that takes into account a series of different variables to classify the extent of physical and functional impairment in patients with asthma and to quantify the effect of the disease on the patient's quality of life (Table 7). Ideally, functional impairment in asthma patients should only be assessed when all the ways of modifying possible aggravating factors have been explored and the patient is following an optimal therapeutic regimen.⁴⁰ In the case of occupational asthma, proper treatment requires avoidance of exposure to the antigenic stimulus, which implies an inability to continue carrying out usual work activities, regardless of the severity of the condition at the time of diagnosis.⁴¹

Lung Cancer

The individual's state of health and life expectancy should be taken into account when assessing disability in

TABLE 7
American Thoracic Society Criteria for Rating Functional Impairment in Asthma³²

Score	0	1	2	3	4
FEV ₁ , % of predicted	>80	70-79	60-69	50-59	<50
Reversibility					
FEV ₁ , %	<10	10-19	20-29	>30	
PC ₂₀ , mg/mL	>8	8-0.5	0.5-0.1	<0.1	
Minimum medication requirements	None	β ₂ -agonists occasionally	β ₂ -agonists and/or inhaled corticosteroids <800 mg	β ₂ -agonists and inhaled corticosteroids >800 mg 1-3 courses/year of oral corticosteroids	β ₂ -agonists and inhaled corticosteroids >1000 mg and daily oral corticosteroids

Total score: 0-14.

Abbreviations: FEV₁, forced expiratory volume in the first second; PC₂₀, provocation concentration of bronchoconstrictor causing a 20% fall in FEV₁.

cancer patients. In addition to assessing the factors that would indicate possible loss of lung function, the physician should also take into account the staging and persistence of the tumor, and use of the Karnofsky scale is recommended.

In general, the following persons are considered unable to do work requiring moderate effort regardless of lung function: patients with a Karnofsky score of less than 80 or disease classified as stage II or higher at the time of diagnosis; and those who have undergone pneumonectomy or require continual chemotherapy. In all patients affected by lung cancer and pleural mesothelioma, it is essential to obtain an exhaustive work history as this is the key element in the search for possible exposure to carcinogenic substances listed as the causal agents of occupational disease.²² If the level of exposure was sufficient and the latency period is consistent with the existence of a causal relationship, the disease should be considered occupational in origin and the patient is entitled to the corresponding benefit.

Sleep Apnea Syndrome

Workers are considered to be incapacitated for work that requires careful attention or entails risk of accident when, despite appropriate treatment, they have an apnea index of 10-20/h. Disability will be extended to cover other types of work if the apnea index is higher or there is concurrent daytime respiratory insufficiency.

Pulmonary Hypertension

Secondary pulmonary hypertension is a sign of severe underlying disease and therefore implies severe dysfunction that would prevent the patient from undertaking almost any kind of work. In primary pulmonary hypertension, the symptoms and prognosis determine disability. Only patients meeting the criteria for class I in the New York Heart Association/World Health Organization classification can continue to work.⁴²

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