

American Thoracic Society (ATS) Criteria for Impairment Rating in a Patient with Asthma

Overview: The American Thoracic Society (ATS) has developed criteria for determining the level of impairment experienced by a patient with asthma. This can be used to monitor a patient and to evaluate the response to interventions.

Parameters: (1) post-bronchodilator FEV1 relative to predicted value

(2) change in FEV1 (reversibility) OR airway hyperresponsiveness

(3) minimum medication needed

Parameter	Finding	Points
post-bronchodilator FEV1	> lower limit of normal	0
	70% to lower limit of normal	1
	60 – 69%	2
	50 – 59%	3
	< 50%	4
reversibility of FEV1 OR airway hyperresponsiveness	FEV1 change < 10% OR PC20 > 8 mg/mL	0
	FEV1 change 10 - 19% OR PC20 0.51 to 8 mg/mL	1
	FEV1 change 20 - 29% OR PC20 0.126 to 0.50 mg/mL	2
	FEV1 change $\geq$ 30% OR PC20 $\leq$ 0.125 mg/mL	3
minimum medication	none	0
	occasional bronchodilator not daily; occasional cromolyn not daily	1
	daily bronchodilator; daily cromolyn; low dose inhaled steroid	2
	bronchodilator on demand and daily high dose inhaled steroid or occasional course of systemic steroids	3
	bronchodilator on demand and daily high dose inhaled steroid and daily systemic steroids	4

where:

- Low dose inhaled steroid is < 800 µg beclomethasone or equivalent.
- High dose inhaled steroid is ≥ 800 µg beclomethasone or equivalent.
- Occasional course of systemic steroids involves 1 to 3 courses per year.
- percent FEV1 change = $100\% * (((FEV1 \text{ post-bronchodilator}) / (FEV1 \text{ prebronchodilator})) - 1)$
- The calculation for PC20 (as a measure of airway responsiveness to methacholine or histamine) is given in the pulmonary chapter.

impairment score = SUM(points for the 3 parameters)

Interpretation:

- minimum score: 0
- maximum score: 11

Score	Impairment Class
0	0
1 2 or 3	I
4 5 or 6	II
7 8 or 9	III
10 or 11	IV
asthma not controlled despite maximal treatment	V

where:

- Asthma not controlled despite maximal treatment = FEV1 < 50% despite prednisone dosing at ≥ 20 mg/day.

References:

American Thoracic Society. Guidelines for the evaluation of impairment/disability in patients with asthma. Am Rev Respir Dis. 1993; 147: 1056-1061.

Demeter SL Andersson GBJ Smith GM. Disability Evaluation. Mosby. 1996. pages 348-349.

Classes of Respiratory Impairment

Overview: The impairment to a person caused by a respiratory disorder can be assessed from pulmonary function tests. Both the American Medical Association (AMA) and American Thoracic Society (ATS) have developed schemes for rating impairment to the whole person.

Parameters studied:

- (1) FVC
- (2) FEV1
- (3) FEV1/FVC
- (4) diffusing capacity of carbon monoxide
- (5) exercise capacity in mL of oxygen per kg per min or as METs

NOTE: The division based on measured oxygen capacity is similar to that used for impairment in ischemic heart disease (above).

AMA Rating Scheme

Class 1: No impairment of the whole person (0%)

- FVC: $\geq 80\%$ of predicted AND
- FEV1: $\geq 80\%$ of predicted AND
- FEV1/FVC: ≥ 0.70 AND
- diffusing capacity D(CO): $\geq 70\%$ of predicted

OR

- VO₂ max (measured exercise capacity): > 25 (mL O₂)/kg/min; > 7.1 METs

Class 2: Mild impairment of the whole person (10-25%)

- FVC: 60-79% of predicted OR
- FEV1: 60-79% of predicted OR
- diffusing capacity D(CO): 60-69% of predicted

OR

- VO₂ max (measured exercise capacity): 20 - 25 (mL O₂)/kg/min; 5.7 - 7.1 METs

Class 3: Moderate impairment of the whole person (26-50%)

- FVC: 51-59% of predicted OR
- FEV1: 41-59% of predicted OR

- diffusing capacity D(CO): 41-59% of predicted

OR

- VO₂ max (measured exercise capacity): 15 - 20 (mL O₂)/kg/min; 4.3 - 5.69 METs

Class 4: Severe impairment of the whole person (51-100%)

- FVC: ≤ 50% of predicted OR
- FEV₁: ≤ 40% of predicted OR
- diffusing capacity D(CO): ≤ 40% of predicted

OR

- VO₂ max (measured exercise capacity): < 15 (mL O₂)/kg/min; < 4.3 METs

where:

- The FEV₁/FVC is expressed as an absolute number and not as a percentage of the predicted value.
- Equations to predict expected values: These are described in Crapo. A more complete overview is available in the chapter on Respiratory and Acid-Base Disorders.
- The resting maximum oxygen consumption in mL per minute per kilogram is defined as 1 MET = 3.5 (mL O₂)/kg/min.

ATS Rating Scheme

This is similar to the AMA rating scheme.

Additions

- Class 2 FEV₁/FVC: 0.60 to 0.74
- Class 3 FEV₁/FVC: 0.41 to 0.59
- Class 4 FEV₁/FVC: ≤ 0.40

Differences

- Class 1 FEV₁/FVC: ≥ 0.75
- Class 1 diffusing capacity D(CO): ≥ 80% of predicted
- Class 2 diffusing capacity D(CO): 60-79% of predicted
- measured exercise capacity not utilized

References:

American Medical Association. Guides to the Evaluation of Permanent Impairment Fourth Edition. 1995. Chapter 5: The respiratory system. pages 154-167; Table 8 page 162.

Crapo RO Morris AH Gardner RM. Reference spirometric values using techniques and equipment that meet ATS recommendations. Am Rev Respir Dis. 1981; 123: 659-664.

Crapo RO Morris AH. Standardized single breath normal values for carbon monoxide diffusing capacity. Am Rev Respir Dis. 1981; 123: 185-189.

Harber P Chan-Yeung M. Chapter 29: Assessment of respiratory impairment and disability. pages 338-354. IN: Demeter SL Andersson GBJ Smith GM. Disability Evaluation. American Medical Association. Mosby. 1996.

Motor Neurone Disease Dyspnoea Rating Scale (MDRS) for Dyspnea

Overview: The MND Dyspnoea Rating Scale (MDRS) is a questionnaire for evaluating the dyspnea felt by a person with a motor neuron disease (MND). It uses 16 items divided into 3 subscales to assess different aspects of the condition. The scale can be monitored over time to help determine disease progression and/or the impact of interventions. The authors are from the University of Liverpool in the England.

Dyspnea and shortness of breath during activities:

- (1) dyspnea during activity 1
- (2) dyspnea during activity 2
- (3) dyspnea during activity 3
- (4) dyspnea during activity 4
- (5) dyspnea during activity 5

Feelings during past 2 weeks:

- (6) frustrated or impatient
- (7) fear or panic
- (8) confidence
- (9) upset worried or depressed
- (10) in control in breathing
- (11) relaxed
- (12) low in energy
- (13) discouraged or down in the dumps
- (14) satisfied or pleased with life
- (15) upset or scared
- (16) restless tense or upset

Frequency of Feelings	Points if Positive	Points if Negative
none of the time	4	0
hardly any of the time	3	1
some of the time	2	2
most of the time	1	3

all of the time	0	4
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Negative items: 1 2 3 4 5 6 7 9 12 13 15 16

Positive items: 8 10 11 14

NOTE: I could not find the authors doing the reverse point assignment for "positive" responses (items 8 10 11 14). They do state that a low number indicates minimal symptoms while a high number indicates greater symptoms.

total score = SUM(points for all 16 measures)

subscale for dyspnea = SUM(points for items 1 to 5)

subscale for emotion = (points for item 6) + (points for item 8) + (points for item 9) + (points for item 11) + (points for item 12) + (points for item 13) + (points for item 14) + (points for item 16)

subscale for mastery = (points for item 7) + (points for item 10) + (points for item 15)

Interpretation:

- minimum score for total or subscale: 0
 - maximum total score: 64
 - maximum dyspnea subscale: 20
 - maximum emotion subscale: 32
 - maximum mastery subscale: 12
 - The higher the score the more severe the problem and the greater the perceived detrimental effect.

References:

Dougan CF, Connell CO et al. Development of a patient-specific dyspnoea questionnaire in motor neurone disease (MND): the MND dyspnoea rating scale (MDRS). J Neurological Sciences. 2000; 180: 86-93.

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