AACVPR
American Association of Cardiovascular and Pulmonary Rehabilitation
Promoting Health & Preventing Disease

SECTION 5: CLINICAL ASSESSMENT TOOLS

Test	Link, Basic Information	Provider Considerations, Price	Sensitivity, Validity, Reliability	Minimal Important Difference (MID)
COPD Assessment Test (CAT)	***COPD Assessment Test (CAT)*** Jones P, Harding G, Berry P et al 2009. The COPD Assessment Test (CAT) is a simple tool to measure of COPD health status and quantify the impact of COPD on one's life and how this changes over time.	The CAT is simple to administer. It provides supplementary information to other COPD assessment as well as a framework for discussion with COPD patients to enable a common understanding and rating of impact of COPD on their life. It aids the clinician in identifying where COPD affects the patients health and daily life the most. Score and impact level: > 30 = very high > 20 = high 10-20 = medium < 10 = low Translations available at www.CATestonline.org. Public domain	Evaluation has found the CAT to have similar discriminative properties as the SGRQ.	N/A
METS (metabolic equivalent) ***See calculation table below.***	See tool below to calculate standard estimates from 6MWD (feet walked) to Metabolic Equivalents or METS (a unit of energy expenditure) from ACSM			

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METS (metabolic equivalent) ***See calculation table below.***	See tool below to calculate standard estimates from 6MWD (feet walked) to Metabolic Equivalents or METS (a unit of energy expenditure) from ACSM			

Clinical Assessment Tools

6 Minute Walk Conversion Table

Distance in feet	Distance in meters	Meters/min	VO2(ml/kg/min)	METs
980	299	50	8.4784	2.42
990	302	50	8.5292	2.44
1000	305	51	8.58	2.45
1100	335	56	9.088	2.60
1200	366	61	9.596	2.74
1300	396	66	10.104	2.89
1400	427	71	10.612	3.03
1500	457	76	11.12	3.18
1600	488	81	11.628	3.32
1700	518	86	12.136	3.47
1800	549	91	12.644	3.61
1900	579	97	13.152	3.76
2000	610	102	13.66	3.90
2100	640	107	14.168	4.05
2200	671	112	14.676	4.19
2300	701	117	15.184	4.34
2400	732	122	15.692	4.48
2500	762	127	16.2	4.63
2600	792	132	16.708	4.77
2700	823	137	17.216	4.92
2800	853	142	17.724	5.06
2900	884	147	18.232	5.21
3000	914	152	18.74	5.35

Example:

1500	**457**	**76**	**11.12**	**3.18**

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Test	
Forced Expiratory Volume in 1 Second (FEV_1)	The FEV_1 is well established as metric for loss of lung function in COPD, associated with lung volume loss at steeper rate than normal controls. Post-bronchodilator FEV_1 is the single most important marker to determine severity and treatment algorithms in COPD. The decline of FEV_1 over time has been traditionally used to indicate disease progression. The diagnosis, staging and treatment of COPD in current guidelines are based on the fixed ratio of FEV_1/FVC (forced vital capacity) and the percentage predicted FEV_1 value. The methodology for measuring forced expiratory maneuvers by spirometry has been standardized by ATS/ERS (Miller M et al 2005). Specific training to yield reproducible and reliable results is mandatory. Patients with similar FEV_1 may represent different underlying phenotypes. No minimal important difference (MID) has been established. A suggested range for the MID for FEV_1 might be 100–140 mL (Cazzola M 2008) but the MID for FEV_1 remains poorly defined for COPD (Rabe K 2005).
BODE Index	The BODE index has been developed as a prognostic marker for COPD in an attempt to integrate systemic and respiratory expressions of COPD in a single grading system (Celli BR, et al, 2004). It comprises four components: nutritional state (**B**MI), airflow limitation (**O**bstruction; FEV_1), **D**yspnea or breathlessness (MMRC Dyspnea scale), and **E**xercise capacity (6MWD, distance walked in 6 min). The BODE index has been used to assess therapeutic efficacy in interventional studies investigating effects of lung volume reduction surgery (Lederer D et al 2007, Pompeo E, Mineo T 2007, Martinez F et al 2008), pulmonary rehabilitation (Cote C, Celli B 2005, Foglio K et al 2007) and physical training (Nasis I, et al, 2009). It provides better power than that of its individual components (e.g., FEV_1) to predict mortality and future exacerbations in severe-to-very severe COPD (Celli B, et al, 2004). The BODE sensitivity to change relies heavily on the change in exercise capacity. An updated point system along with regression model is recommended (Puhan et al, 2009). It is unclear that changes seen post PR (mainly due to 6MWD) would translate into lower mortality. A MID has not yet been defined.

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COMPETENCY: SIX MINUTE WALK TEST (6MWT) IN OUTPATIENT PULMONARY REHABILITATION

Name / Title / Credentials _____ Evaluation date_____

Expectation: The BLS prepared (ACLS preferable) pulmonary rehabilitation clinician will demonstrate correct methods of instructing, performing (including monitoring), documenting and reporting the 6MWT as a clinical outcome measurement.

Before the test:

- Standardize the shape of the walking course with a long, flat, straight, enclosed corridor measuring a minimum of 100 feet that is free of other traffic that may interfere with the walk. (Do not vary the location of the test for each patient).A medical history has been reviewed and any precautions or contraindication have been identified. ATS, AACVPR and ACSM differ on absolute or relative contraindications for 6MWT. Rehabilitation centers need to identify which of these parameters are used and use them consistently.
  - ◊ **ATS 2003 6MW statement** identifies absolute contraindications as unstable angina and / or MI during the past month. Relative contraindications include a resting HR > 120, SBP > 180 mm Hg, and / or DBP > 100 mm Hg. Patients with any of these should be referred to the physician ordering or supervising the test for an individual clinical assessment and a decision about the conduct of the test. Resting EKG from past 6 months, if available, should be reviewed before 6 MWT. Stable exertional angina is not an absolute contraindication, but these patients should perform the test after using their anti-angina medication, and rescue nitrate medication should be readily available.
  - ◊ **AACVPR Guidelines**, Chap.4: Relative precautions to exercise testing include resting heart rate > 125 beats/min after 10 min. rest, systolic BP > 200 mm Hg and / or diastolic BP > 110/100 mm Hg.
  - ◊ **ACSM Guidelines for Exercise Testing and Prescription**, 8th ed. Chapter 5, page 107: Exercise testing after MI can be performed before or soon after hospital discharge for prognostic assessment, activity prescription, and evaluation of further medical therapy or interventions, including coronary revascularization. Submaximal tests may be used before hospital discharge at 4 to 6 days after acute MI.

- A short acting inhaled bronchodilator medication may be taken within 1 hour of testing or upon arrival if prescribed by the physician. Document the name and dose of inhaler used and time taken.
- The patient will rest at least 10 minutes before beginning the test with comfortable ambient temperature & humidity maintained.
- Comfortable clothes and shoes should be worn and the patient should be walking with their usual aids such as rollator, walker or cane. Document any oxygen used (type, flow rate, continuous vs. pulse and if carrying or pulling in a cart).
- ATS recommends repeating the test at similar times of the day if possible. Pulse oximetry is required in the pulmonary rehabilitation setting. Note pulse regularity and whether the oximeter signal quality is acceptable. If oximetry is used, hand held oximeters should be worn in a fanny pack or other means, in order not to influence the patient's pace.

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Critical elements performed by staff person:

		Proficient	Needs review/ improvement	Inadequate
1.	Identifies appropriate patients to participate, following policy and above procedure for indications & contraindications			
2.	Prepares equipment in advance, e.g. emergency equipment (automatic defibrillator), measured 100 feet distance hallway or track, stop-watch or count-down timer, B/P cuff & stethoscope, oximeter, O2 with cart / carrier, walker, Borg scale etc. Hall is marked every 10 feet and at 'turnaround' points.			
3.	Explains the purpose of test to the patient & gives standardized instructions. Advises patient in use of Borg dyspnea tool to report maximum dyspnea with 6MWT. Borg may be used for fatigue and / or effort.			
4.	Demonstrates correct technique for advising and supervising the patient to walk alone. The patient may use their usual walking aids if needed. Resting, including sitting is permitted if necessary, while clock keeps running. If stopping during the test, the patient is advised to resume walking when able. **"*The object of this test is to walk as far as possible for 6 minutes. You will walk back and forth in this hallway. Six minutes is a long time to walk, so you will be exerting yourself. You will probably get out of breath or become fatigued. You are permitted to slow down, to stop, and to rest as necessary. You may lean against the wall while resting, but resume walking as soon as you are able. You will be walking back and forth around the marker. You should pivot when turning around the marker and continue back the other way without hesitation. Now I'm going to show you. Please watch the way I turn without hesitation."*** Demonstrate by walking one lap yourself. Walk and pivot around a marker briskly. ***Are you ready to do that? I am going to keep track of the number of laps you complete. Remember that the object is to walk AS FAR AS POSSIBLE for 6 minutes, but don't run or jog.***"			

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Critical elements performed by staff person:

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5.	Gives standardized encouragement (in even tones) at specific time intervals: After the first minute, tell the patient the following: "***You are doing well. You have 5 minutes to go."*** When the timer shows 4 minutes remaining, tell the patient the following: "***Keep up the good work. You have 4 minutes to go."*** When the timer shows 3 minutes remaining, tell the patient the following: "***You are doing well. You are halfway done."*** When the timer shows 2 minutes remaining, tell the patient the following: "***Keep up the good work. You have only 2 minutes left."*** When the timer shows only 1 minute remaining, tell the patient: **"*You are doing well. You have only 1 minute to go.*"**Do not use other words of encouragement (or body language to speed up).			
6.	Monitors O2 saturation, heart rate, and Borg dyspnea before, during (at maximal level), & after the test. BP is checked before and after test. Uses hospital-based protocol for oxygen titration. An example is included below.			
7.	Documents test performance and assessment of patient's responses.			
8.	Enters selected test data, e.g. distance achieved in feet or meters, number of stops etc.			
9.	Compares entry & exit results and reports findings including change in distance and clinical findings to patient and physician.			
10	Follows hospital policy for when to stop the 6MW test and documents and reports abnormal findings.			
11.	Follows hospital policy for monitoring oxygen saturation and titration of supplemental oxygen during the test.			

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Two examples of oxygen titration are included below.

Programs need to have documented protocols for oxygen titration:

1. For subjects with oxygen saturation (SpO_2) > 90% at rest on room air, patients will begin the 6MWT on room air. For all other subjects, the 6MWT will be performed using continuous flow supplemental oxygen by nasal cannula with the following titration protocol:

If baseline SpO_2 at rest is < 90%, titrate oxygen to achieve SpO_2 90% at rest
Begin walk
After 2 minutes, if SpO_2 < 90%, increase oxygen flow rate /FiO_2, usually 2-3 lpm while walking.
After 4 minutes, if SpO_2 < 90%, increase oxygen flow rate /FiO_2 2-3 lpm while walking.
If SpO_2 is < 80% for greater than 10 seconds, stop the test and evaluate for artifact, circulation issues etc.

For all subjects, record the baseline oxygen saturation, the amount of oxygen used (and if titrated, the titration details), the stop time, and the lowest SpO_2 achieved. During subsequent 6MWTs, begin walk with same FiO_2 as determined to be required during first 6MWT and titrate if clinically indicated.

2. Some programs do not titrate oxygen during 6 MWT. An example includes providing oxygen if the test is stopped due to desaturation (≤ 85%) during testing. If desaturation occurs during walking/testing, the patient is rested, started on O_2 and/or re-titrated. For patients without O_2 ordered, perform test on room air unless SpO_2 < 90% at rest. Consider for O2 assessment:

1) Assess at rest and with 6 MWT on room air if SpO_2 > 90%. 2) If SpO_2 < 90% (below 88% for Medicare criteria) during 6 MWT, patient is then assessed with supplemental O_2 and continuous oximetry monitoring on the treadmill or level walking surface with close observation of workload and oxmietry wave form 3) Patient is assessed on whatever conserving delivery device that may be used to support portability.

For knowledge	For skills
• ATS 6MWT: http://ajrccm.atsjournals.org/cgi/content/full/166/1/111 • *AACVPR Guidelines For Pulmonary Rehabilitation Programs 4th Ed*, 2011 • JCRP article: *COPD Stage and 6 Minute Walk Outcome*, Sept-Oct 2001	• Instruction/demonstration session by expert on 6MWT • Practice & return demonstration on staff • Observation of an actual test on a PR patient

Evaluation:

Staff signature _____ Date _____