risk of embolic stroke. Currently, with a sensitivity in excess of 98%, thoracic CT is the 'gold standard' for detecting PAVMs but involves a significant radiation exposure.[1] Hence screening tools without a radiation burden such as oxygen shunt studies or cardiac bubble echo (CBE) are often considered as first line investigations for right-to-left shunts. With the recent introduction of CBEs to our hospital we collected data on patients who underwent both CBE and oxygen shunt studies. We looked retrospectively at 11 patients with suspected HHT (as defined by the Curacao criteria[2]) investigated over the last 5 years and aimed to determine the sensitivity and specificity of each screening test compared to thoracic CT (Abstract P40 Table 1). The oxygen shunt study had a sensitivity of 57% and specificity of 75%. CBE had 100% sensitivity (in five patients) but two studies were positive in the absence of detectable PAVMs on CT. Our data suggest that oxygen shunt studies are not sufficiently sensitive to be used as a screening tool for PAVMs. CBE is a useful initial screening test. A negative CBE combined with a negative chest x-ray has been shown to have a negative predictive value of 100% for PAVMs.[3] This screening strategy is especially useful when the risk of CT irradiation is considered unacceptably high, for example in younger women. All patients with a positive CBE should undergo further imaging with thoracic CT to confirm the presence of PAVMs and to determine their size prior to consideration for embolisation therapy.

Abstract P40 Table 1 Patients with suspected HHT arranged by CT thorax result with outcomes of other screening studies

Patient	HHT clinical diagnosis	CT thorax	Cardiac bubble echo	Oxygen shunt study
1	Definite	+	+	–
2	Definite	+	NR	+
3	Definite	+	+	–
4	Definite	+	+	+
5	Definite	+	+	+
6	Definite	+	NR	+
7	Possible	+	+	–
8	Possible	–	NR	+
9	Probable	–	+	–
10	Possible	–	+	+
11	Probable	–	NR	+

"+" = positive study, "–" = negative study, "NR" = Study not requested.

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Pulmonary rehabilitation

P41 THE COPD ASSESSMENT TEST (CAT) USED TO EVALUATE OUTCOME IN PULMONARY REHABILITATION

doi:10.1136/thx.2010.150961.41

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Introduction Outcomes in pulmonary rehabilitation (PR) can be evaluated using exercise performance tests and health status measures such as the St George's Respiratory Questionnaire (SGRQ) and Hospital Anxiety and Depression Score (HADS). The SGRQ and HADS are timing consuming and difficult to analyse and may dissuade patients from attending. The COPD Assessment Test (CAT) is a shorter, simpler questionnaire for assessment and monitoring of health status in COPD. Scores range from 0 to 40. A high score indicates poor health status. CAT score correlates with SGRQ ($r>0.8$)[1].

Objective To determine if the CAT score could replace existing measures of health status in the evaluation of pulmonary rehabilitation.

Method 70 patients underwent standard PR in community and hospital based programs. 45 were men and 25 were women. The mean age was 69. The vast majority of patients attending had COPD, confirmed by spirometry and clinical assessment. They had MRC score of 3 or more. All patients completed CAT, SGRQ questionnaires and did a modified shuttle walk test (MSWT) at the beginning and end of the program.

Results After PR mean SGRQ score reduced by 5.54 (CI: 2.6 to 8.4, $p<0.001$). CAT score reduced by 2.08 (CI: 0.8 to 3.3, $p=0.001$). MSWT distance increased by 75.7 metres (CI: 55.7 to 95.8, $p<0.001$). Anxiety and depression scores reduced by 1.64 (CI: 0.6 to 2.6, $p= 0.002$) and 1.02 (CI: 0.17 to 1.88, $p= 0.02$) respectively. At baseline, the CAT score correlated moderately with SGRQ ($r=0.48$), shuttle walk ($r=0.47$), and HADS ($r=0.43$). The change in CAT before and after PR correlated weakly ($r=0.38$ $p=0.001$) with the change in SGRQ, and MSWT ($r=0.45$ $p<0.001$), and not significantly with change in HADS ($r=0.28$ $p=0.059$).

Conclusion Jones et al. have evaluated the CAT in pulmonary rehabilitation.[2] Their study reported an improvement in CAT of 2.2. At baseline, CAT correlated well with CRQ (Chronic Respiratory Questionnaire) domain scores. Change in CAT correlated with change in CRQ domain scores. Our study confirms CAT score can detect improvement in health status after PR. However, the lack of stong correlation with SGRQ & HADS suggests CAT should not be assumed to be equivalent in the evaluation of PR.

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P42 COMPARISON OF A 1- AND 2-WALK PROTOCOL FOR THE ENDURANCE SHUTTLE WALK TEST WHEN MEASURING CHANGE DUE TO THERAPEUTIC INTERVENTION IN COPD PATIENTS

doi:10.1136/thx.2010.150961.42

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Introduction The endurance shuttle walk test (ESWT) is an externally paced field endurance walking test. To perform the ESWT requires two incremental shuttle walk tests (ISWTs) to determine the walk speed for the ESWT, a practise ESWT (pESWT) and a repeat ESWT. The minimum important clinical difference (MCID) has been reported as 68%.[1] Limits of agreement between ESWT carried out with and without a practise walk on the same day have

Abstract P42 Table 1 Results of comparison between two ESWT protocols

	2-walk protocol	1-walk protocol
Baseline completion	71%	88%
Baseline and discharge completion	54%	71%
Ceiling effect	7.3%	12.2%
Floor effect	4.9%	4.9%
Baseline limits of agreement	± 88 s (95% CI±32)	
Limits of agreement for change	± 80% (95% CI±25.6)	