We wanted to evaluate whether videoed presentations would be an acceptable medium for delivering the educational component of an outpatient PR programme.

Method Educational sessions were delivered by the multidisciplinary team at a large teaching hospital, and were professionally filmed. Talks covered were: disease education, healthy eating, medicines, avoidance and exacerbations, exercise and activity, energy conservation, relaxation, managing breathlessness and chest clearance. Patients undertaking PR were asked to evaluate the content and delivery of education sessions using a feedback questionnaire. One patient group evaluated the spoken sessions and a second group evaluated the DVDs. Patients' knowledge was assessed with The Bristol COPD Knowledge Questionnaire (BCKQ) before and after rehabilitation.

Results 117 patients completed feedback forms. A maximum of 69 rated the DVD sessions; mean (SD) age 71.13 (9.69), FEV_1 1.25 (0.55) l, COPD 79.7%. A maximum of 48 patients rated the spoken sessions; mean (SD) age 64.94 (12.59), FEV_1 1.54 (0.63) l, COPD 69.8%. Not all patients rated all sessions. Delivery was rated as satisfactory or better by 99.16% of patients and 99.49% of patients for DVD and spoken groups, respectively. Initial mean (SD) BCKQ scores were 28.34 (10.30) and 26.41 (13.92) for the DVD and talk group, respectively. Both groups improved BCKQ scores following PR; mean (SD) change 4.53 (10.11) for DVD group and 7.36 (8.98) for talk group, but there were no between group differences (p=0.905).

Conclusion PR patients perceive education delivered by DVD acceptable both in content and medium of delivery. DVDs may be a feasible alternative if multidisciplinary speakers cannot be arranged. This educational medium may also be helpful in reducing the overall costs of rehabilitation, or, if DVDs were to be watched in patients' homes, increasing programme capacity by reducing the duration of each supervised session. For example; for a rolling programme the cost is approximately £1747.60 per programme, per speaker (Agenda for Change Band 6).

P145 EFFECT OF PULMONARY REHABILITATION ON WAIST CIRCUMFERENCE AND WAIST-HIP RATIO

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Background Patients with chronic obstructive pulmonary disease (COPD) have increased cardiovascular risk. In selected COPD patients, recent studies have shown that pulmonary rehabilitation (PR) may improve markers of cardiovascular risk, such as arterial stiffness, blood pressure and fasting cholesterol. Waist circumference and waist-hip ratio are related to increased risk of cardiovascular disease, type II diabetes and mortality. We investigated the effect of PR on waist circumference and waist-hip ratio in an unselected population referred for PR.

Methods 256 consecutive patients (181 COPD; 117F:139M; median age 69; median FEV_1 49% predicted) completing an eight week outpatient PR programme were analysed. Waist circumference, waist-hip ratio and body mass index (BMI) were measured immediately before and after PR. Wilcoxon signed rank test was used to test the effect of PR.

Results Following PR, there were significant improvements in incremental shuttle walk (ISW) and chronic respiratory disease questionnaire (CRDQ) score (Abstract P145 table 1). There were very small, but statistically significant, reductions in weight, BMI and waist circumference but no changes in waist-hip ratio.

Abstract P145 Table 1 Effect of pulmonary rehabilitation (PR) on incremental shuttle walk (ISW), chronic respiratory disease questionnaire (CRDQ), waist circumference and waist hip ratio

Outcome measure	Pre-PR	Post-PR	p Value
ISW (metres)	180 (90, 300)	240 (140, 380)	<0.001
CRDQ Total	75.7 (20.3)	92.5 (75, 111)	<0.001
Weight (kg)	74 (62, 88)	73 (62, 89)	0.004
BMI (kg/m^2)	27.0 (23.3, 31.8)	26.8 (23.1, 31.5)	0.002
Waist circumference (cm)	100 (90, 111)	98 (89, 111)	0.002
Waist-hip ratio	0.96 (0.89, 1.02)	0.96 (0.90, 1.02)	0.55

Data expressed as median (25th, 75th centiles) or mean (SD).

Conclusions An 8-week outpatient PR programme has no clinically meaningful effect upon waist circumference or waist-hip ratio.

P146 VALIDATION OF THE COPD ASSESSMENT TEST (CAT) IN PULMONARY REHABILITATION: APPLICATION TO A COHORT OF MIXED PULMONARY DISEASES

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Introduction The CAT is a new self administered questionnaire developed and validated for the assessment and monitoring of COPD patients.[1] Recently, it has been showed to be sensitive to pulmonary rehabilitation (PR) in a prospective multicentric COPD study.[2] The CAT has never been validated in a global PR programme with mixed pulmonary diseases.

Methods We performed a retrospective study of 30 patients who completed the CAT before and after PR in 2010–2011. The cohort included seventeen patients diagnosed with COPD, seven with asthma and six with fibrosis. All participants were referred for an 8 weeks, three times weekly rehabilitation programme. Our primary objective was to validate the CAT in the cohort. We also evaluated six other outcome measures of PR as a secondary endpoint (Abstract P146 table 1). Pre and post PR variations were calculated with a nonparametric Wilcoxon test and Spearman rank correlation test was used to assess the relationship between measures.

Abstract P146 Table 1 Response to pulmonary rehabilitation

Outcome measures	Before PR	After PR	Change	SD	p Value
CAT	20.5	17.3	−3.2	5.5	<0.01
Number climbed stairs	45.1	162.1	113.1	63.0	<0.01
Waist circumference (cm)	100.1	99.6	−1.5	1.5	<0.01
Mean bicycle power (watts)	28.6	37.6	9.0	4.9	<0.01
Walking distance (km)	0.72	0.89	0.17	0.07	<0.01
Bicycling distance (km)	3.77	4.54	0.77	0.41	<0.01
Hand gripping strength (lbs)	76.4	80.1	4.4	8.0	<0.01

Results The CAT decreased significantly by a mean of 3.2 (p<0.01) following PR. The mean CAT score change was similar in all pulmonary disease groups and between obstructive and non obstructive diseases. The pre and post CAT score negative variation was 4.16 (p<0.05) for women, 3.74 (p<0.05) for patients younger than 70 years old and 4.41 (p<0.05) for patients with <1 exacerbation yearly. No correlation between the CAT score change and the FEV_1 (r=−0.11) was found. Of all the outcome measures, the number of climb stairs was the most responsive with an amelioration of 250% after PR.

Conclusion Even if the CAT was initially developed for the assessment of COPD patients, our study has shown that the

questionnaire is responsive to a chronic lung disease's population undergoing rehabilitation. A prospective study is now required to expand the application of the CAT to the general assessment of patients with chronic lung diseases.

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P147 OUTCOMES OF PULMONARY REHABILITATION IN SEVERE ASTHMA

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Objectives Structured physical training programmes are a key component of pulmonary rehabilitation (PR) and have consistently been shown to be of significant benefit to patients with COPD. It is unclear whether the application of similar principles provides similar health improvements in patients with severe asthma. We aimed to assess this by studying the effects of pulmonary rehabilitation in a group of patients with severe asthma and significant disability who have completed our standard 7 week PR programme.

Methods 111 patients with a physician diagnosis of severe asthma who have completed our standard PR programme were studied. Assessments including spirometry, chronic respiratory questionnaire (CRQ), hospital anxiety and depression scores (HAD) and incremental and endurance shuttle walk testing (ISWT, ESWT) were performed at baseline and completion to determine the effect of PR. Baseline demographic and spirometric data were compared with a larger population of patients with severe asthma attending our difficult asthma clinic (DAC).

Results Following rehabilitation, statistically significant improvements were seen in MRC dyspnoea score (mean (95% CI) improvement −0.35 (−0.13 to −0.57), p=0.003); HADS anxiety (−1.4 (−0.4 to −2.3), p=0.007); HADS depression (−1.2 (−0.2 to −2.2), p=0.026); CRQ dyspnoea (+0.72 (+0.33 to +1.1), p=0.001); CRQ fatigue (+0.92 (+0.65 to +1.2), p<0.001); CRQ Emotion (+0.64 (+0.36 to +0.92), p<0.001); CRQ mastery (+0.47 (+0.13 to +0.81), p=0.007); Incremental shuttle walk test (ISWT) (+63 m (49.5 to 76.5), p<0.001); and Endurance shuttle walk test (ESWT) (+339.7 m, (249.7 to 429.7), p<0.001). Interestingly however, patients with severe asthma who completed pulmonary rehabilitation were older (66 vs 48 yrs p<0.01), more likely to have smoked (69.5% vs 43.5%, p<0.01), and tended to have more severe fixed airflow obstruction (FEV_1% predicted 55.9 vs 71.9, p=0.28) than our DAC population. This may be because clinicians were more likely to refer patients with asthma who had a COPD-like phenotype or because patients with severe asthma were more likely to drop-out of the programme.

Conclusion Pulmonary rehabilitation may offer significant benefit to patients with severe asthma though further work is needed to identify the patients mostly likely to benefit and the optimum training required.

P148 THE ADAPTATION AND EVALUATION OF THE LIVING WELL WITH COPD PROGRAMME FOR PULMONARY REHABILITATION

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Introduction Mechanisms and materials to support the delivery of the education component of pulmonary rehabilitation are not widely available. The aim of this study was to adapt the Living Well with COPD (LWWCOPD) programme for embedding in pulmonary rehabilitation and to conduct a process and outcome evaluation.

Methods *Adaptation*: Modifications to the LWWCOPD programme were informed by focus groups, current practice, relevant research and guidelines, and in collaboration with the authors of the LWWCOPD programme. The study used a cohort before-after design which incorporated the principles of a process evaluation. *Evaluation*: Sites administered their usual pulmonary rehabilitation programme with the exception of the LWWCOPD programme for pulmonary rehabilitation to deliver the education component. Health professionals and patients completed evaluation questionnaires to assess their acceptance. Patients completed the Understanding COPD (UCOPD) questionnaire and the Bristol COPD Knowledge Questionnaire before and after pulmonary rehabilitation. *Analysis*: Feedback and comments on the programme were collated and categorised. Changes in the UCOPD questionnaire and BCKQ were examined using paired t-tests.

Results *Adaptation*: Amendments to the LWWCOPD programme included reducing the number and length of education sessions, incorporating additional information/techniques, materials to link the education and exercise sessions and a COPD action plan. *Evaluation*: 25 health professionals and 57 patients with COPD from eleven pulmonary rehabilitation programmes evaluated the LWWCOPD for pulmonary rehabilitation. The mean (SD) duration of the education sessions was 41 (9) min. The health professionals felt that the education sessions were either excellent (n=16/65, 25%) or good (n=40/65, 62%), and that they were comprehensive, evidence-based and utilised a good combination of teaching strategies for example, "Easy to follow and deliver". They reported that the programme would require modification for non-COPD patients. Patients commented on improved knowledge and self-efficacy, peer support and relevant content for example, "Better understanding of action to be taken". They requested supplementary information for family members. The UCOPD questionnaire and the BCKQ improved significantly: mean change (95% CI): UCOPD questionnaire: 26.8 (21.7 to 31.8)%, BCKQ: 10.6 (6.9 to 14.4)%.

Conclusion The LWWCOPD programme for pulmonary rehabilitation is a feasible, effective and versatile way to deliver the education component of COPD pulmonary rehabilitation.

P149 PILOTING AND EVALUATING POST-PULMONARY REHABILITATION (PR) LONG-TERM EXERCISE (LTE) FOR COPD PATIENTS

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Introduction There is evidence that regular exercise profoundly affects both the course and outcome of COPD. While PR is well established for COPD patients limited by breathlessness, there is currently no evidence-base for follow-on LTE, which takes into account expressed desires of patients to continue exercise regularly. This pilot study aimed to evaluate an easily accessible, disease appropriate, regular LTE for COPD patients who complete PR, to