

## Abstract P141 table 1

No. of questionnaires used	1	2	3	4	5
No. of services	4	15	8	4	1

**Conclusions** PR is not available in five PCTs, despite evidence for its value, and capacity does not match need. Half of PCTs offer post-PR programmes reflecting demand from patients who complete PR. Studies of the value of maintenance PR are now needed. Reducing unwarranted variation in assessment process (questionnaires and walking tests), and completion (definition and rates) using standardised approaches to delivery and measurement would potentially release capacity for unmet need.

**P142 PEDOMETER AND ACTIVITY MONITOR STEP COUNT RELIABILITY COMPARED TO VISUAL DURING WALKING IN PATIENTS WITH CHRONIC RESPIRATORY DISEASE**

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**Introduction** Chronic respiratory disease (CRD) is associated with reduced physical activity (PA), which pulmonary rehabilitation (PR) can improve. There are a variety of devices which monitor PA. Activity monitors (AM) are relatively small devices which utilise several accelerometers, temperature sensors and the galvanic skin response to provide data regarding energy expenditure, metabolic equivalents and step counts. However, AM's are expensive compared to pedometers and do not provide instant feedback. Our aim was to assess the reliability of step counting by pedometers and AM's compared to visual counts at varying walking speeds in patients with CRD.

**Methods** 48 patients with CRD wore a Yamax pedometer and a Sensewear Pro<sup>3</sup> AM during an ESWT as part of their PR discharge assessment. Speeds were calculated from ISWT and patients had performed the ESWT at baseline, in line with standardised guidelines. Patients requiring walking aids were excluded. Step counts were measured by the pedometer, AM and visually by a separate assessor. Visual step counts were considered "gold-standard" for comparison. For analysis, average step counts for 1 min were calculated at slow, medium and fast speeds. A Friedman's ANOVA test with post-hoc Wilcoxon signed rank was used to compare visual step counts to the pedometer and AM, as the data were not normally distributed.

**Results** The Friedman's ANOVA demonstrated there was a significant difference between the pedometer, AM and visual step counts at slow ( $p=0.0001$ ) and medium ( $p=0.009$ ) speeds but not at fast speeds ( $p=0.174$ ). Abstract P142 table 1 demonstrates where the differences are between the pedometer, AM and visual step counts from the Wilcoxon signed rank test.

**Conclusions** At slow and medium walking speeds, there was a significant difference between visual counts and the pedometer and AM. There was also a significant difference between the AM and pedometer at slow speeds. At fast walking speeds there was no significant difference between the visual, pedometer and AM step counts. Overall, both the pedometer and AM underestimated steps at slow and medium walking speeds and are therefore not be suitable for use in patients with CRD who often walk slowly.

## Abstract P142 Table 1

Speed	Mean visual steps (SD)	Mean AM steps (SD)	p Value between visual and AM	Mean pedometer steps (SD)	p Value between visual and pedometer	p Value between pedometer and AM
Slow (1.78–2.72 km/h)	79.46 (15.72)	67.98 (15.47)	0.001*	59.43 (22.31)	0.001*	0.023*
Medium (3.00–3.79 km/h)	96.19 (9.80)	77.50 (27.26)	0.004*	72.04 (38.40)	0.003*	0.836
Fast (4.11–5.54 km/h)	107.00 (14.18)	102.42 (16.46)	0.134	105.19 (24.80)	0.605	0.255

\* denotes significant difference ( $p=0.0167$  after bonferroni correction).

## P143

## EXPLORATION OF PATIENT ACTIVITY LEVELS FOLLOWING THORACOTOMY AND LUNG RESECTION

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**Background** Reduced activity is a routine observation following major surgery, however no studies have yet measured or explored this. Causative factors include sedative drugs, reduced exercise tolerance and pain, as well as pre-existing pathology. We aimed to measure postoperative activity and observe outcomes of thoracotomy and lung resection patients, as well as identify predictive factors.

**Methods** A prospective observational study was conducted in a regional thoracic surgery centre. Sense Wear Pro 3 armbands were worn by patients from postoperative day (POD) 1 to 4. Post-operative physiotherapy included early mobilisation, which was progressed daily.

**Results** 99 patients were observed, 46 male (46%) and 92 (93%) had lung cancer. Mean (SD) age was 67 ( $\pm 10$ ) years and percentage predicted FEV<sub>1</sub> 75% ( $\pm 19$ ). During PODs 2/3 patients took a median (IQR) of 472 (908) steps with >99% of time spent in sedentary activity (<3 METs). Low activity was defined as <500 steps during PODs 2/3 (n=50), and high activity >500 steps (n=49). Patients with lower activity demonstrated a median of only 220 (282) steps compared to 1128 (960) in more active patients ( $p<0.001$ ), less time spent in moderate activity >3 METS ( $p=0.003$ ) and more perceived pain during PODs 2/3 ( $p=0.013$  and 0.004 respectively). Frequency of postoperative pulmonary complication (PPC) was 4% (n=2) vs 20% (n=10) ( $p=0.34$ ) in patients with lower activity, with a median LOS of 6 (3) days vs 5 (2) days ( $p=0.013$ ). Logistic regression identified age =75 years, predicted FEV<sub>1</sub> <70% and poor preoperative activity to be predictive of reduced postoperative activity, and COPD predictive of PPC ( $p<0.05$ ).

**Conclusion** Low activity levels following thoracotomy are common despite regular physiotherapy; studies measuring pre and post-operative activity are needed to reveal the exact impact of surgery. It is not known whether reduced activity may cause PPC, or vice versa, and studies randomising patients to lower/ higher activity are needed to confirm this. Predictive factors could potentially be modified by preoperative physiotherapy/rehabilitation, and targeted postoperative exercise and escalation of analgesia may also be beneficial, however, evaluation of these strategies is required.

## P144

## EVALUATION OF MULTIDISCIPLINARY PULMONARY REHABILITATION EDUCATION DELIVERED BY EITHER DVD OR SPOKEN TALK

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**Introduction** Education is a core component of a multidisciplinary Pulmonary Rehabilitation (PR) programme. It is commonly delivered as a spoken session. This can create delivery problems when speakers are unavailable, and adds to the costs of a PR programme.

## Poster sessions

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<sub>1</sub> 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<sub>1</sub> 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<sub>1</sub> 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 <sup>2</sup> )	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.<sup>1</sup> Recently, it has been showed to be sensitive to pulmonary rehabilitation (PR) in a prospective multicentric COPD study.<sup>2</sup> 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<sub>1</sub> ( $r=-0.11$ ) 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