baseline and 7 weeks. Within and between group differences were analysed using paired and unpaired t-tests respectively.
Results Please see table 1.
Conclusion SPACE for COPD can improve dyspnoea and endurance capacity over 7 weeks to a similar level to PR, although it remains unclear to its noniferiority to PR. The SPACE for COPD programme does offer a number of health benefits despite it involving limited support and could offer a suitable alternative to patients with COPD who would otherwise not attend conventional rehabilitation.

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S25 THE EFFECTS OF MAINTENANCE SCHEDULES FOLLOWING PULMONARY REHABILITATION IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Background There is good evidence that pulmonary rehabilitation (PR) provides benefit for patients with chronic obstructive pulmonary disease (COPD) in terms of quality of life and daily functioning. However it is generally accepted that the benefits diminish over time.
Methods We conducted a randomised controlled parallel study of a maintenance programme, following standard PR, consisting of a two hour session of education and strength and endurance training every 3 months versus standard care. Measurements were made, at baseline (prior to a standard PR programme), at randomisation (after successful completion of a PR programme) and after 12 months, of the chronic respiratory questionnaire (CRQ), endurance shuttle walk test (ESWT), EuroQol (EQ5D), hospital anxiety and depression score (HADS) and activity questionnaires. CRQ was also completed every 3 months by post.
Results 250 (139 male) patients, mean (SD) age of 69.2 (9.2) years, FEV1 41 (16)% predicted, provided informed consent to participate in the study. The mean (95% CI) improvement in CRQ following the initial PR was 0.76 (0.59, 0.93) units. 148 patients entered the randomised part of the study. There remained a significant improvement in CRQ dyspnoea at 12 months compared to baseline for the group as a whole. However, there was no statistically significant differences detected between the intervention and control groups for the CRQ dyspnoea score, which amounted to 0.19 (-0.26, 0.64) units, or other domains of the CRQ. There was no difference in the ESTW distance between the two groups (109.1 (-100.1 to 318.2) metres) or HADS (-0.2 (-2.41,2) units). There was a higher level of self-reported activity, according to the visual analogue score of 16.2/100, in the maintenance group but not the reported metabolic equivalent (MET)-minutes per week. There was no difference in any of the CRQ measures at any of 3 monthly measurements between the intervention and control groups
Conclusion A maintenance programme of 3monthly 2 hour sessions does not improve outcomes in patients with COPD after 12 months. We cannot recommend that our maintenance programme is adopted. It is likely that a maintenance programme should commence earlier than 3 months and possibly be more intensive.

S26 SEVERE HOSPITALISED EXACERBATIONS OF COPD WITH AN EOSINOPHILIC PHENOTYPE HAVE FAVOURABLE OUTCOMES WITH PREDNISOLONE THERAPY: SUB-ANALYSIS FROM A PROSPECTIVE MULTI-CENTRE RANDOMISED CONTROL TRIAL

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Introduction In moderate exacerbations of COPD, patients with the eosinophilic phenotype (>2% of the total leukocyte count) have better outcomes with prednisolone. However, it remains unclear whether patients with severe exacerbations displaying the eosinophilic phenotype have accentuated recovery following corticosteroid therapy compared to non-eosinophilic COPD exacerbations.
Aim Measure the incidence of eosinophilic and non-eosinophilic severe exacerbations of COPD, from a large prospective enhanced recovery multi-centre randomised control trial and investigate severity and recovery between these groups.
Methods COPD patients entering the programme delivered immediately on hospitalisation for an acute exacerbation of chronic respiratory disease to improve long term health outcomes (clinical trial registration ISRCTN05557928) were analysed using admission details, length of stay and proceeding exacerbation history. All patients were dichotomised into eosinophilic (>200 $x10^6$ cells/mL and/or >2% of the total leukocyte count) and non-eosinophilic. CRP was measured on admission.
Results There were 243 COPD patients (117 males) identified. The mean (range) age was 71 years (45–93) and the majority of patients (55%) had been hospitalised for an exacerbation of COPD in the previous 12 months. Of all exacerbations, the inpatient mortality rate was 3% (median time to death 12 days, range 9–16) and approximately 90% received both antibiotic and corticosteroid treatment. The incidence of an eosinophilic exacerbation was 25% (median absolute eosinophil count 100 $x10^6$cells/ml; range 10 to 1500). In patients with eosinophilic exacerbations compared to non-eosinophilic exacerbations the median (IQR) CRP concentration was significantly lower (12mg/L (5–47) vs. 55mg/L (18–139), $p < 0.001$); and the presence of an elevated eosinophil count and elevated CRP (>200 $x10^6$ eosinophils/mL and CRP>50mg/L) occurred in only 5% of all exacerbations. The length of stay was significantly shorter in patients with eosinophilic exacerbations compared to non-eosinophilic exacerbations (mean (range) 5.0 (1–19) vs. 6.5 (1–33), $p = 0.015$). The severity of the index exacerbation or the rate of exacerbations or hospitalisations in the following 12 months was not statistically significant between groups.
Conclusions In severe hospitalised exacerbations of COPD, a proportion have an associated eosinophilic phenotype. These exacerbations are usually not associated with an elevated CRP. Eosinophilic exacerbations have better responses to oral corticosteroids with shortened length of stay.

S27 THE EFFECTS OF STATIN THERAPY ON INFLAMMATORY MARKERS IN PATIENTS WITH COPD: A DOUBLE BLIND RANDOMISED CONTROLLED TRIAL

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Background Systemic and airway inflammation are recognised in COPDand reducing inflammation has been postulated to alter disease course[1]. Statins have pleiotropic effects including anti-inflammatory properties[2]. A study in asthma showed that statins reduced sputum macrophage levels[3]. We hypothesised that statins would reduce systemic (hs-CRP) and airway (exhaled nitric oxide: FeNO, sputum neutrophils and macrophages) inflammation in patients with COPD.

Methods Clinically stable patients with confirmed COPD were recruited and randomised to either simvastatin 20mg od (active) or placebo for 6 weeks in a double blinded parallel group randomised controlled trial. Circulating hs-CRP and fasting lipids were measured in all subjects' pre- and post- treatment. 5-flow FeNO and induced sputum were performed in consenting patients where possible pre- and post-treatment. Primary analysis compared the six week change in each inflammatory marker between active and placebo groups.

Results Patients were matched for age, sex, smoking and lung function; active: n = 33, placebo: n = 37. Compliance was good and the active group achieved total cholesterol reduction: between arms mean (95% CI): -1.1 (-1.3, -0.8)mmol/L, $p < 0.001$. Baseline median (IQR) hs-CRP was 3.09 (1.3–7.4)mg/l but there was no significant change after treatment between active and placebo: between arms mean (95% CI) 0.5(-3.2, 4.1) mg/l. Baseline sputum samples were obtained in n = 27 and 22/27 had neutrophilic sputum. Paired samples were obtained in 20 patients: active n = 8 and placebo n = 12 with no significant difference in change between treatment arms for sputum neutrophils or macrophages. FeNO was measured in 36 patients: active n = 17, placebo n = 19 with no significant difference in change between arms.

Conclusions In this pilot RCT, despite significant lipid lowering, there was no demonstrable systemic or airway anti-inflammatory effect over 6 weeks with simvastatin 20mg od in patients with COPD. Baseline results showed a majority had neutrophilic sputum however only a small proportion had airway inflammation evaluation.

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S28 NEUROMUSCULAR ELECTRICAL STIMULATION (NMES), A NEW STRATEGY IN THE PULMONARY REHABILITATION OF PATIENTS WITH SEVERE AND VERY SEVERE MRC 4 AND 5 CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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Introduction and Objectives Current National Institute of Clinical and Health Excellence (NICE) COPD guidelines (2010) recommend that pulmonary rehabilitation (PR) is made available to all appropriate people with COPD. However, house-bound patients with severe and very severe COPD (MRC 4/5) are not always able to access PR. This creates an inequality in access to health care. This pilot study investigated the effectiveness of home provision of neuromuscular electrical stimulation (NMES) and low-intensity symptom-limited exercise (LISLE) on exercise capacity and health related quality of life in severe and very severe COPD patients.

Methods Patients with severe COPD (MRC 4 and 5) with a mean FEV_1 of 25% predicted (± 7.8) were randomised into two 16-session PR programmes, delivered twice weekly for 8 weeks. Group A received NMES and LISLE while Group B only received LISLE. Primary outcomes were the six minute walk test (6MWT) and the St George's respiratory questionnaire (SGRQ). Secondary outcomes were the London Chest Activity of Daily Living Scale (LCADL), and the Hospital Anxiety and Depression Scale (HADS).

Results Ten patients (5 males) with severe COPD were recruited (mean age: 76 years ± 7.7, BMI: 26 ± 4, MRC: 5 ± 0.3, FEV_1:25 ± 7.8). There were no significant between-group differences in the 6MWT, SGRQ or HADS ($p > 0.05$), but there was a significant improvement in LCADL in group A compared with group B (median difference: -12 vs -1, $p < 0.001$). Within-groups, there were significant improvements in the 6MWT, SGRQ and LCADL scores in both groups A & B, but no change in the HADS. Within-groups, improvements in the 6MWT and LCADL were likely to be clinically important in group A alone (Table 1).

Conclusion This study showed that a combination of NMES with LISLE resulted in largely similar improvements to LISLE alone. The addition of NMES may be more effective in improving activities of daily living and exercise tolerance but the cost of providing equipment and specialist staff for delivering this individualised home treatment must be weighed against the clinical benefits.

Changes in Primary and secondary outcome measures

All changes in outcome measures are explained below and recorded as shown below in Table 1.

Abstract S28 Table 1. Within –Group comparison (pre vs. post) and Between–Group Comparison (A vs. B) for primary and secondary outcome measures

	Group A				Group B				A vs. B
Outcome	pre	post	median diff	P value	pre	post	median diff	P value	Asymp. (2 tailed sig)
6MWT(m)	30 ± 119	74 ± 129	44	0.04*	27 ± 7.8	40 ± 22	13	0.04*	0.220
SGRQ	73 ± 11	62 ± 17	11	0.04*	78 ± 10	67 ± 16	14	0.04*	0.75
LCADL	52 ± 7.3	36 ± 11	12	0.04*	23 ± 24	22 ± 26	1	0.03*	0.01§
HAD	14 ± 8.6	13 ± 6.2	1	0.18	14 ± 3.6	15 ± 3.8	1	0.46	0.08

Data are presented as median ± SD unless otherwise indicated
pre = pre low intensity PR or NMES
post = post low intensity PR or NMES
* significant different from pre, significant difference between group A and B