

confirm that it is realistic and assess whether PR benefits can be sustained.

**Methods** Three suitable venues, geographically distributed to maximise access, and two exercise instructors (completed Loughborough Training for Chronic Respiratory Patients) were identified. Patients completing PR were recruited into 1×weekly LTE groups. Outcomes (demographic, disease severity, functional capacity (6 min walk test (6MWT), emotional (Hospital Anxiety and Depression HAD score, CAT and Chronic Respiratory Questionnaire CRQ)) were collected at baseline, 6 and 12 months. Patient and carer satisfaction was recorded at 6 and 12 months. Attendance data were monitored throughout. Hospital admissions for 12/12 before and after LTE commenced, continues to be audited.

**Results** 60 COPD patients (Mean (SD) age 68.75 (10.31) yrs, FEV<sub>1</sub> 1.27 (0.56) l, 43% male, 22% current smokers, three on LTOT) were referred for LTE June 2010–May 2011. 20/60 (33%) never attended, 14/60 (23%) dropped out within 2 (1–7) months (median (range). 26/60 (43%) continue to exercise, median (range) since starting 5 (1–12) months with 50 (28)%. (Mean (SD) classes attendance. CAT, CRQ, HADS and 6MWT findings are given in the Abstract P149 table 1. Satisfaction surveys indicate high levels of satisfaction with venue, instructor and content. No adverse events occurred during the classes. Direct cost per class (hall hire and instructor) £63.

**Abstract P149 Table 1 Health related quality of life and exercise capacity at end-PR, 6 months and 12 months of long-term exercise**

	Baseline, n=60, mean (SD)	6 Months, n=11, mean (SD)	12 Months, n=3, mean (SD)
MRC	3.2 (0.8)		
CAT score	22.2 (6.8)	12.4 (7.4)	17.0 (14.1)
CRQ Dyspnoea	3.3 (1.4)	4.2 (1.6)	4.9 (1.9)
CRQ fatigue	4.1 (1.5)	4.9 (1.2)	4.7 (2.5)
CRQ emotional function	4.8 (1.6)	5.3 (1.3)	4.8 (2.9)
CRQ mastery	4.9 (1.7)	5.8 (1.4)	4.1 (1.9)
HADS anxiety	7.4 (5.1)	4.3 (3.3)	6.0 (6.0)
HADS depression	5.2 (4.2)	3.6 (2.5)	4.7 (4.7)
6 MWT (metres)	353 (116)	338 (83)	330 (122)

**Conclusions** This pilot demonstrates feasibility of providing community-based LTE groups using instructors trained to exercise people with COPD. Patients who choose to attend LTE have moderate COPD, but high CAT scores indicating important disease impact on daily functioning. Attendance rate was high for a patient group susceptible to exacerbations, possibly reflecting high patient satisfaction. Preliminary findings suggest LTE in group settings promotes maintenance of benefits acquired from PR with further improvement in health-related quality of life (CRQ and CAT).

**P150 USE OF AMBULATORY OXYGEN THERAPY IN PULMONARY REHABILITATION**

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**Introduction and Objectives** Pulmonary rehabilitation (PR) is proven to improve oxygen exercise capacity, health status and reduce dyspnoea in patients diagnosed with Chronic Obstructive Pulmonary Disease. Previous studies have shown no significant difference in rehabilitation outcomes following use of supplemental oxygen

during pulmonary rehabilitation. Unfortunately, a few patients are unable to exercise due to hypoxia related dyspnoea depriving them of the benefit of PR. We hypothesised that the use of Ambulatory Oxygen Therapy (AOT) in patients with exercise induced desaturation would increase their capability of undergoing PR and have an overall positive outcome.

**Methods** Requirement of AOT is routinely assessed at our trust prior to commencing PR. Incremental oxygen is used to decide on the flow rate needed during PR. A retrospective study was performed to evaluate the benefits of AOT in patients desaturating on exertion. Data were analysed using Excel.

**Results** 218 patients were enrolled for the programme from January 2009 to July 2010, 46 excluded as not suitable or did not attend. Numbers studied-172: 59% male, mean age 70 (range 45–90), 25% current smokers. On initial endurance exercise test 27% (n=47) were noted to have exercise induced desaturation. Seven patients were already on long-term oxygen therapy. Median prescribed flow rate was 2 l/min during PR. The mean distance walked on initial endurance test was 150 m. This improved significantly to 263 m (p<0001) with AOT. 68 % (n=32) attended for post PR endurance exercise testing, 25% no longer required AOT (did not desaturate). Of the 22 patients (46%) who continued to require AOT, 14 were prescribed. Following 2 months of the prescription, AOT was withdrawn in four patients as they found the cylinder too heavy or did not benefit.

**Conclusions** AOT has shown significant improvement in rehabilitation outcomes in patients with exercise induced desaturation. A quarter of these patients did not require any further ambulatory oxygen therapy following pulmonary rehabilitation.

**Abstract P150 Table 1**

Paired t test	Mean distance on initial endurance exercise test, 150 m	p Values
Mean distance on AOT	263 m	0.0001
Mean distance post PR	277 m	0.0069
Mean distance post PR + AOT	356 m	0.0003

**P151 COST OF PULMONARY REHABILITATION IS OFFSET BY REDUCTION IN HEALTHCARE UTILISATION**

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151 patients completed pulmonary rehabilitation over a period of over 4 years at our hospital. Retrospective analysis of 71 patients from this group was done. This showed that there was a significant difference between pre and post rehabilitation in FVC, VC, HADS depression score & SWT (shuttle walk test distance). Analysis of a sub group of 37 patients at 6 months after pulmonary rehabilitation showed that there were still significant differences in HADS depression & SWT, but not the other variables. We were able to establish a significant reduction in healthcare utilisation, both in hospital admissions and in out patient attendances. This was independent of the reported level of benefit on CRDQ scores. “Responders” (patients with a more than 1.5 increase in each of their CRDQ scores) had similar reduction in healthcare utilisation compared to “non-responders” (patients with <0.5 difference or deterioration in their CRDQ scores). At our hospital the approximate cost of pulmonary rehabilitation is 375 pounds per person. Out patient (respiratory) appointments and hospital admissions

were noted for 1 year prior to and 1 year post rehabilitation. Our data showed that there was a 74% reduction in hospital admissions and a 51% reduction in out patient follow-up appointments in the 1-year after pulmonary rehabilitation. Our calculations showed that pulmonary rehabilitation was a cost effective intervention. In an attempt to identify patients who would respond well/poorly to pulmonary rehabilitation we looked at the baseline characteristics of “responders” vs “non responders”.

**Responders** Mean age 67.4 (range 50–82), mean FEV1 –0.84 (range 0.38–1.6), (FEV1%–37.2), mean FVC –1.93 (range 0.8–2.96), (FVC % 64), mean VC –2.08 (range 1.03–3.17), 54% were male, 46% female, 36% lived alone, mean pack years smoked 36.9 (range 0–80).

**Non responders** Mean age 68 (range 44–80), mean FEV1 –1.29 (range 0.65–3.11), (FEV1%–45.9), mean FVC –2.51 (range 0.86–3.65), (FVC% 79.1), mean VC –2.71 (range 0.98–4.67), 50% were male, 50% female, 31% lived alone, mean pack years smoked 27.46 (range 1–80). This study raises questions with regard to the importance of current CRDQ assessment in rehabilitation. It also shows that the cost of pulmonary rehabilitation is at least offset by reduction in healthcare utilisation.

## Lung cancer: advances in diagnosis and delivery of care

**P152 THE NATIONAL LUNG CANCER AUDIT: YEAR 6 COMPLETENESS AND OUTCOMES**

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**Introduction** The National Lung Cancer Audit is run jointly by the Royal College of Physicians and The Information Centre for health and social care, and is commissioned by the Healthcare Quality Improvement Partnership (HQIP). Its development was driven by the realisation that lung cancer outcomes vary widely across the UK and are poor compared to other western countries. The aim of the audit is to facilitate service improvement by recording elements of process and outcomes in lung cancer on a large scale and, using case-mix adjustment, to explain the wide variations noted and improve standards of care. Although several other countries also submit data to the audit, this abstract presents provisional results for England only.

**Results** In Year 6, participation has again increased and all trusts have now contributed data at some time. Completeness of data on individual cases remains high although it is noteworthy that 18% of cases are submitted without a disease stage and 16% without performance status. This year the results show that the histological confirmation rate has risen substantially to nearly 77%, and 96% of patients have been discussed in an MDT, although the surgical resection and anti-cancer treatment rates have not increased further.

**Conclusions** Participation remains high and the audit continues to collect data on close to 100% of cases of lung cancer and mesothelioma that present to secondary care. Overall treatment rates seem to have stopped improving, although it is acknowledged that some of the earlier annual improvements reflected improvements in data quality. The rise in HCR is likely to reflect a real change in practice, possibly due to the new found importance of tissue (choice of chemotherapy, use of EGFR antagonists) and possibly due to the focus given to HCR by the audit itself. It is of concern that a significant minority of patients appear to be managed without information on disease stage and PS—key variables needed for appropriate management of patients.

Abstract P152 Table 1

	2005	2006	2007	2008	2009	2010
<b>Data completeness</b>						
Number of cases	10 920	16 922	20 639	25 757	30 158	30 329
PS	66%	77%	80%	87%	88%	84%
Staging	51%	55%	70%	77%	80%	82%
Treatment	66%	72%	79%	82%	89%	89%
<b>Process and outcomes</b>						
Confirmed histological diagnosis	68%	66%	65%	66.7%	69.5%	76.5%
<b>Histology</b>						
NSCLC	44.8%	43.9%	45.5%	52.2%	56%	57%
SCLC	10.3%	10%	9.6%	10.3%	10.5%	10.9%
Mesothelioma	3.7%	3.5%	4.2%	4.4%	5.0%	5.5%
NSCLC NOS rate	—	36%	32%	33.6%	30%	24%
Discussed at MDT?	79%	84.3%	86.8%	88.6%	93.2%	96.1%
Any anti-cancer treatment?	45%	50%	52%	54%	58.9%	58.5%
<b>Overall surgical resection rate</b>						
NSCLC resection rate	13.8%	14.3%	15.2%	16%	19%	18.3%
SCLC chemotherapy rate	57.7%	61.7%	64.5%	63%	66%	65%
1 year survival	35.5%	35.0%	34.6%	34.7%	35.2%	35.8%

**P153 MEASURING VARIATION IN DECISION MAKING WITHIN LUNG CANCER MULTIDISCIPLINARY TEAM (MDT) MEETINGS—A PILOT STUDY**

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**Introduction** MDT meetings are now an essential and integral part of lung cancer services but no formal measurement of the variability of decisions made by these teams has been studied. Variation in decision making may be an important factor influencing the UK-wide differences in lung cancer outcomes and survival.<sup>1</sup>

**Aim** The aim of this pilot study was to develop and trial a tool for measuring variation in decision making within MDTs.

**Method** Seven anonymised clinical cases were provided for discussion with accompanying radiology and histology to 12 MDTs in two regional lung cancer networks. MDTs were asked to provide a comprehensive plan for further investigation (if necessary) and treatment for each case. They were encouraged to specify modality of treatment. Treatment decisions were compared across the participating MDTs and a simple scoring system devised to rate concordance. 10 MDTs provided enough data for analysis. Straight-forward cases were considered by the investigators to have only one clear preferred treatment. Complex cases were less clear cut and

Abstract P153 Table 1 Decisions made by MDTs

Case	Preferred treatment	MDT 1	MDT 2	MDT 3	MDT 4	MDT 5	MDT 6	MDT 7	MDT 8	MDT 9	MDT 10
<b>Straight-forward cases</b>											
1	Surgery	S	S	S	S	S	U	S	U	S	U
2	Palliative	P	P	P	P	P	P	XR	P	P	P
3	Palliative	P	XR	P	P	P	P	P	P	P	P
<b>Complex cases</b>											
4	Radical radiotherapy	P	XR	XR	XR	XR	P	XR	P	P	P
6	Surgery	S	S	S	U	XR	S	S	S	P	P
7	Palliative	P	XR	P	P	P	P	P	P	P	P

S, surgery; XR, radical radiotherapy; P, palliative; U, unspecified.

However, a potential important confounding factor may explain a part of their results: undiagnosed pulmonary embolism (PE), mimicking (or induced by) COPD exacerbation. Troponin and BNP are factors associated with poor prognosis in PE.<sup>2</sup> COPD is associated with an increased risk of deep venous thrombosis and PE (particularly during exacerbation) and with an increased risk of fatal PE.<sup>3</sup> In particular, COPD is associated with increased risk of death from undiagnosed PE.<sup>4</sup>

The real incidence of PE during exacerbation of COPD is not clearly known, ranging from 1.5% to 24.7%<sup>5</sup> corresponding to the incidence of elevated troponin and BNP, as noted by Chang *et al* in their cohort. Therefore, it would be of great interest if Chang *et al* could provide us some precise answers:

- ▶ In how many of the 250 patients a PE has been evoked and/or eliminated?
- ▶ How many patients were under efficient anticoagulant drugs at inclusion?
- ▶ How many patients received thromboprophylaxis, as a significant number of patients included presented other PE risk factors such as malignancy or cerebrovascular diseases?

Because of reserved prognosis of COPD patients with PE, and of the availability of preventive and curative specific drugs, COPD patients admitted with exacerbation and with abnormal cardiac biomarkers may require a PE screening and effective thromboprophylaxis if PE has been ruled out.

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## Authors' response

We thank Bertoletti and colleagues for raising the important issue of pulmonary embolism (PE) in the exacerbation of chronic obstructive pulmonary disease (COPD).<sup>1</sup> Although we did not routinely investigate for PE in our cohort, we excluded any patients with suspected or confirmed PE from the study.<sup>2</sup> Unfortunately, it is difficult to detect thromboembolic events in this population and it is possible that we included some patients with subclinical pulmonary emboli. It is also plausible that this contributed to the association between elevated cardiac biomarkers and mortality. However, we think that this is unlikely to be the only mechanism.

Thromboprophylaxis was administered to some patients during their admission depending on their immobility and other risk factors, but this would not have influenced the NT-proBNP or troponin T results obtained on presentation. We did not collect information on pre-existing anticoagulation therapy on admission to the study.

Further research into the mechanism linking elevated cardiac biomarkers and mortality in COPD exacerbation is needed. We agree with Bertoletti and colleagues that investigating the contribution of concurrent PE is important, as this is something that can be treated.

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## CORRECTIONS

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*Thorax* 2011;**66**:A128–A129 doi:10.1136/thoraxjnl-2011-201054c.151. P151 Cost of pulmonary rehabilitation is offset by reduction in healthcare utilisation. The author list and author affiliations for this poster should read: <sup>1</sup> S Kibe, <sup>1</sup> D Ford, <sup>2</sup> S Hart. 1 Scarborough General Hospital, Scarborough, UK; 2 Castle Hill Hospital, Hull, UK.

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*Thorax* 2011;**66**:A133–A134 doi:10.1136/thoraxjnl-2011-201054c.163. P163 Factors influencing histological confirmation of diagnosis in lung cancer patients. The author list for this poster should read: S Chandramouli, M Cheema, J Corless. Wirral Lung Unit, Arrowe Park Hospital, Wirral CH49 5PE, UK.

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*Thorax* 2011;**66**:A162–A163 doi:10.1136/thoraxjnl-2011-201054c.233. P233 Judicious use of oximetry can help deliver cost effective sleep service. The author list and affiliation for this poster should read: C L Collins, B Balakrishnan, J Madieros, M Sovani. Queen's Medical Centre, Nottingham University Hospitals, Nottingham, UK.

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*Thorax* 2011;**66**:A140 doi:10.1136/thoraxjnl-2011-201054c.179. P179 The changing numbers and indications of mediastinoscopy procedures performed following the introduction of endobronchial ultrasound at a UK tertiary centre. The author list and affiliations for this poster should read: <sup>1</sup>M Bakir, <sup>2</sup>R Breen, <sup>2</sup>A Quinn, <sup>2</sup>J King, <sup>1</sup>G Santis. 1 Kings College London, London, UK; 2 Guy's and St Thomas' NHS Foundation Trust, London, UK.