P = 0.39). Allocation to vitamin D was associated with accelerated sputum smear conversion (adjusted HR 1.47, 95% CI: 1.09 to 1.98, P = 0.01) and a small but statistically significant reduction in the mean number of zones affected on chest radiograph at 8 weeks (5.48 vs. 5.69, 95% CI: for difference 0.06 to 0.77 zones, p = 0.02).

Conclusions This is the largest randomised controlled trial to investigate effects of adjunctive vitamin D on time to sputum culture conversion in pulmonary tuberculosis conducted to date. Adjunctive high-dose vitamin D was effective in elevating serum 25(OH)D concentrations to high-physiological levels, but did not influence time to sputum culture conversion.

S114 PREDICTORS OF PRIMARY TREATMENT FAILURE IN CHILDREN WITH EMPYEMA

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Introduction and objectives Empyema is a relatively rare but severe form of respiratory infection in childhood associated with significant morbidity. A decade long prospective observational study of paediatric empyema – the UK-ESPE study – completed recruitment in April 2016. This preliminary analysis focused on identification of predictors of primary treatment failure.

Methods Data were available from 23 UK centres on 542 patients aged 0–16 years, admitted between December 2006 to December 2015, who were diagnosed with empyema and required pleural drainage. A standard logistic regression approach was used to evaluate the influence of age, sex, pre-hospital illness length, total illness length, time from admission to pleural drainage, length of pleural drainage, length of hospital stay, primary treatment modality and co-morbidity on the risk of primary treatment failure. Variables were investigated using univariate analysis and those that were significant were included in a multivariate model. Stepwise removal was then used to generate a parsimonious final multivariate model. The primary outcome measure was treatment failure as defined by a second procedure carried out >24 hours after the primary pleural drainage procedure.

Results The study group was 56% male, median age was 4 years (IQR 2–7). Recorded pre-hospital illness length was a median of 7 days (IQR 4–10) and total hospital length of stay 12 days (IQR 9–16). 34.7% of children had a co-morbidity recorded. Baseline characteristics were similar in children who did (n = 37) or did not fail (n = 505) primary treatment. There was substantial variation in the choice of primary treatment; chest drainage alone (20.1%), chest drainage with fibrinolytics (58.4%), video-assisted thoracoscopic surgery (12.1%), decortication (8.9%) and other treatments (0.3%). Treatment failure occurred in 6.9% of children and no demographic factor was found to influence treatment failure. The only significant predictor of treatment failure was primary method of treatment (Table). The relative risk of treatment failure was highest in children who received chest drainage alone (OR = 3.04 (95% CI: 1.47–6.27)).

Conclusions In this large cohort no predictors of treatment failure other than primary treatment modality were identified and those who had chest drainage alone had the highest risk of failure.

Abstract S114 Table 1 Parsimonious multivariate model of potential predictors of treatment failure

Covariant	OR	95% CI	P value
Drainage and fibrinolysis	Standard for comparison		
Drainage alone	3.04	1.47–6.27	0.003*
Video-assisted thoracoscopic surgery	1.14	0.32–3.20	0.821
Decortication	1.53×10^{-7}	N/A[1]	0.987
Other procedure	1.53×10^{-7}	N/A[1]	0.987

OR = Odds ratio CI = Confidence interval *p-value > 0.05
[1]N/A 95% CI values were too small to compute

S115 HOT-HMV UK TRIAL SECONDARY OUTCOME ANALYSIS: EARLY READMISSION IS REDUCED BY THE ADDITION OF HOME MECHANICAL VENTILATION TO HOME OXYGEN THERAPY IN COPD PATIENTS WITH CHRONIC RESPIRATORY FAILURE FOLLOWING A LIFE-THREATENING EXACERBATION

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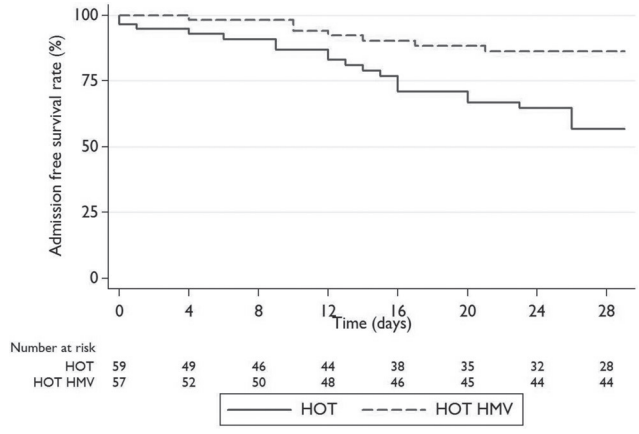
Introduction Hospital readmission following treatment for a life-threatening exacerbation of COPD with acute NIV is frequent and associated with an adverse impact in terms of lung function and health related quality of life. They have been identified as a priority area in the NHS with financial penalties for any patient readmitted within 28 days following discharge.

Method A multicentre open labelled randomised controlled trial recruited patients with persistent hypercapnia ($PaCO^2$ > 7 kPa) 2–4 weeks following resolution of acute acidosis. Patients were randomised to either home oxygen therapy (HOT) or HOT and home mechanical ventilation (HOT-HMV). HMV was titrated overnight to control nocturnal hypercapnia. Follow up was for 12 months. The primary outcome, 12-month admission free survival, has been reported previously demonstrating a significant treatment effect (ERS 2016). Secondary outcome analysis included 28-day all-cause hospital readmission and 12 month exacerbation rate.

Results 116 patients were randomised (HOT = 59, HOT-HMV = 57), age 67 ± 10 years, FEV1 0.6 ± 0.2 L, $PaCO^2$ 7.9 ± 0.9 kPa. 28-day readmission was 22 (37%) in the HOT and 7 (12%) in the HOT-HMV arm (unadjusted HR 0.27, 0.12 to 0.63, p = 0.003; adjusted HR 0.26, 0.11 to 0.61, p = 0.002) (Figure 1). 12 month exacerbation rate was reduced from median 5 (1 to 9) per year in the HOT arm to 4 (2to 6) in the HOT-HMV arm (unadjusted HR 0.64 (0.44 to 0.94); p = 0.022; adjusted HR 0.66, 0.46 to 0.95, p = 0.026).

Conclusion The addition of HMV to HOT in patients with persistent hypercapnia following an acute life-threatening exacerbation of COPD reduces both 28-day readmission and 12 month exacerbation frequency. These data strongly support a change in

clinical practice in the management of patients with severe COPD and persistent hypercapnia.



Abstract S115 Figure 1 Time to hospital re-admission by treatment arm

S116 HOT DECAF: A RCT COMPARING HOME TREATMENT AND INPATIENT CARE IN COPD EXACERBATIONS SELECTED BY LOW RISK DECAF SCORE

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Background The DECAF score is a robust predictor of early mortality in patients admitted with an acute exacerbation of COPD (AECOPD),[1] and should be routinely documented on admission.[2] Of importance, 45–53% of admitted patients are low risk by DECAF (0–1), therefore potentially suitable for hospital at home (HAH). Compared to existing criteria, selection by DECAF would allow inclusion of substantially more patients, some with higher medical dependency.

Methods In a randomised controlled trial (RfPB PB-PG-0213-30105), patients admitted with an AECOPD were allocated to HAH or usual care (UC). Readmissions for AECOPD within 90 days were managed according to the allocated arm, provided they were low risk (DECAF = 0–1). Eligibility criteria included: primary diagnosis AECOPD, DECAF score 0–1, age 35 or more, 10 or more cigarette pack-year history and obstructive spirometry (FEV1/VC less than 70%). Total bed days and readmissions over 90 days, and 14 and 90 day mortality were captured. At day 14, patients were asked for their preferred place of care during future exacerbations of similar severity.

Abstract S116 Table 1 Outcome by allocated group

Outcome	UC n = 58	HAH n = 60
Bed days, n (IQR)	5 (2–12)	1 (1–7)
Readmission*†	23 (39.7%)	22 (36.7%)
14 day mortality*	0	0
90 day mortality*	1 (1.7%)	1 (1.6%)
Preference for HAH	51/57	54/60

*All cause. †One or more readmissions.

Results Between June 2014 to January 2016 118 of 207 eligible patients were randomised: female = 56/118 (52.5%), mean age (SD) = 69.8 (10.2), mean FEV1% predicted (SD) = 43.9 (17.6) and coexistent pneumonia = 24/118 (20.3%).

At 14 days, 105/117 (90%) patients expressed a preference for HAH. Median bed days were 4 days lower in the HAH arm (p = 0.001), with no difference in mortality or readmissions.

Conclusions Selection for HAH by low risk DECAF score is safe, clinically effective, preferred by most patients, reduces total bed days and is a suitable option for up to 50% of admitted patients.

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Occupational Lung Disease

S117 WORK-RELATED SYMPTOMS IN LABORATORY ANIMAL WORKERS

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Introduction Laboratory animal workers frequently report ocular, nasal and respiratory symptoms which occur in the workplace and improve away from work. A proportion of these will be sensitised to animal proteins on the basis of skin prick tests (SPTs) or serum specific IgE testing and will have laboratory animal allergy. The remainder will have work-related symptoms due to other (unknown) causes.

Methods We performed a cross-sectional study (SPIRAL (Safe Practice In Reducing Allery in Laboratories)) of laboratory animal workers exposed to mice across six UK research institutions. Participants completed a self-administered questionnaire, which included detailed questions about symptoms, and underwent SPT to common aeroallergens and mouse epithelium, and specific IgE testing to mouse proteins (epithelium and urine). Those participants reporting ocular, nasal or respiratory symptoms which were worse at work were compared with those with no association between their symptoms and work.

Results 685 laboratory workers were recruited (response rate 88%). 187 (28%) reported at least one symptom and of these, 45% (n = 85) were work-related (WR). 56/105 (53%) reported work-related conjunctivitis; 67/156 (43%) reported WR nasal symptoms and 22/44 (50%) reported WR respiratory symptoms. There were no differences between the two groups in sex, smoking status, atopy to a common aeroallergen or job title. Those with at least one WR symptom were significantly more likely to be sensitisied to mouse proteins (32 (37.7%) vs 10 (9.8%) p < 0.001 (Table). WR symptoms were significantly more common in those working with mice housed in open cages compared with those housed in Individual Ventilated Cages (IVCs) Prevalence of sensitisation to a common aeroallergen was similar in both groups.

Conclusion In this large study population, prevalence of WR symptoms is reasonably high in all laboratory animal workers and is attributable to mouse allergy in around 50% of cases, consistent with other previous studies. Symptoms are less prominent in people working with IVCs compared with conventional open cages. Exposure to airborne endotoxin may be a cause for nasal and respiratory symptoms on exposure to mice in non-mouse