time was less than 3 weeks and only one-fifth of patients required nocturnal non-invasive ventilation. NMD-CWD patients were most likely to survive hospital but almost one-third of COPD patients died during the weaning process. COPD patients had the worst outcome at 2-years, whereas over half of the NMD-CWD patients were alive at 2-years. These data strongly support the Department of Health's plan to develop 'Complex Home Ventilation, Weaning and Rehabilitation Centres' as part of the investment in specialist respiratory services to enhance patient outcome.

Abstract S133 Figure 1

S134 ACTIVITY MONITORING IN INTENSIVE CARE UNIT SURVIVORS: ASSESSING DAILY PHYSICAL ACTIVITY WITH OBJECTIVE OUTCOME MEASURES

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Introduction and Objectives Intensive care unit (ICU) survivors commonly report long-term functional disability and reduced daily physical activity (PA). This adversely impacts on their health-related quality of life (HRQL). We aimed to investigate the relationship between subjective and objective measures of PA in this patient group.

Methods Subjects were ICU survivors drawn from the 63 participants of the Musculoskeletal Ultrasound Study in Critical Care: Longitudinal Evaluation (MUSCLE) study. All were over 16 years, invasively ventilated for > 48 hours with an ICU length of stay >7days. Objective (SenseWear Pro accelerometers, Body-Media Inc, Pittsburgh, US) and self-reported subjective PA levels (HRQL SF-36 questionnaire, QualityMetric Inc, Lincoln, US) were measured.

Results At 18 months 20 pts had died; 17 were lost to follow-up, and 1 withdrew. 27 patients were studied (14 female) with a mean age $\pm$ SEM of 56.6 ± 3.6 years and a post-ICU discharge

time of 576 ± 190 d. SF-36 scores were lower than normal range scores. Age-adjusted (AA) mean steps/day correlated with norm-based physical component summary (PCS) SF-36 scores (Pearson's $r = +0.58$; $p < 0.01$), but there was no correlation with the mental component summary scores (Fig. 1). AA daily step variation showed positive associations with absolute levels of AA daily steps ($r = +0.85$; $p < 0.01$), SF-36 physical function (PF) scores ($r = +0.62$; $p < 0.01$), and prior working status ($r = +0.69$; $p < 0.01$); and a negative association with chronic disease ($r = -0.54$; $p < 0.01$). Levels of AA daily steps contributed more to AA daily step variation than SF scores ($r^2 = 0.72$, 0.38 respectively). Receiver Operator Characteristic analysis indicated that AA daily steps and PF scores are good (but non-significant) predictors for working post-ICU (0.88, 0.86 respectively; $p > 0.05$).

Conclusion This is the first report on the use of activity monitors in ICU survivors, and indicates that subjective and objective measures of PA are correlated. Such complementary data can be used to investigate functional disability in critical illness survivors. Both methods of assessing PA identified strong associations with health and socio-economic factors. Variation in step count, and specifically lack of variation in step count, may be more attributable to absolute step count than self-reported PF or chronic disease. Objective PA measures may offer advantages for monitoring post-ICU patients compared with subjective methods.

Correlations between Activity and SF-36 forms

Abstract S134 Figure 1. Correlations between Physical Function and Mental Component Summary SF-36 Scores against Physical Activity.

S135 LONG-TERM OUTCOMES IN PATIENTS REFERRED TO A SPECIALISED WEANING CENTRE; THE IMPACT OF REFERRAL SOURCE, NON-INVASIVE VENTILATION AND DIAGNOSIS

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Introduction The expansion of specialised weaning centres serving networks of external ICUs has been recommended by the NHS commissioning board. However, data are limited for this proposed model of care. Papworth Hospital provides a multi-disciplinary weaning service in-line with these recommendations.

Methods We analysed the records of patients transferred to our service for weaning from invasive ventilation (IMV) between 1992–2011 inclusive. Patients were categorised according to diagnosis (neuromuscular, COPD, post-surgical, non-COPD respiratory, chest-wall disorders and others).

Spoken sessions

Results 458 patients receiving IMV (92% via tracheostomy) were transferred (mean age 61 years, 259 (57%) male, 421 (92%) from external ICUs with a median ICU stay of 33 days. On arrival, 422 (92%) were ventilator-dependent and 37 (8%) required nocturnal IMV. The median PaCO₂ was 10 kPa. Neuromuscular problems included Motor Neurone Disease (21%), Tetraplegia (12%), Muscular Dystrophies (11%), and Myotonic Dystrophy (9%).

417 (91%) patients survived to hospital discharge, with 330 (72%) weaned from IMV (median stay 24 days if decannulated, 37 days if IMV continued). Non-invasive ventilation (NIV) facilitated weaning in 79%. From the date of ICU admission, 63% of the whole cohort were alive at 1 year, 43% at 3 years, and 33% at 5 years. When adjusted for case-mix, survival was similar for external and in-house referrals. At least 343 (82%) survivors were discharged home. Further outcome data are summarised in Table 1.

COPD patients had the lowest rate of death and/or failed decannulation (13%); further, long-term NIV was associated with a significant increase in survival ($p = 0.01$), despite normocapnia (5.9kPa) if completely weaned. 33% neuromuscular patients required long-term IMV, typically due to bulbar problems, although 65% were discharged home. Continued IMV in other groups conferred a very poor prognosis.

Conclusions These data confirm high levels of survival and discharge home in patients referred to a specialised weaning service. Repatriation to the referring ICU was rarely necessary. NIV was important in the graded withdrawal of IMV and the provision of domiciliary care. In COPD, NIV use on discharge was associated with improved survival. Overall outcomes were favourable when compared to international data and are supportive of current national service plans.

Abstract S135 Table 1. Outcomes with respect to diagnostic group and mode of ventilation on discharge

Total (N)	Hospital survival		Ventilator-free		Domiciliary NIV		Continued invasive ventilation	
	N (%)	N (%)	Survival	N (%)	Survival	N (%)	Survival	
Neuromuscular (165)	159 (96)	36 (22)	37 (6-110)	68 (41)	34 (12-78)	55 (33)	17 (2-34)	
COPD (104)	97 (93)	49 (47)	17 (5-27) [†]	43 (41)	27 (5-62) [†]	5 (5)	4 (1-13)	
Post-surgical (66)	58 (88)	27 (41)	47 (6-92)	17 (26)	17 (2-55)	13 (20)	1 (0-53)	
Other Respiratory (50)	37 (74)	19 (38)	12 (2-100)	14 (28)	31 (5-90)	4 (8)	2 (1-24)	
Chest Wall (35)	34 (97)	3 (9)	156 (13-)	28 (80)	76 (30-165)	3 (9)	5 (3-)	
Other (38)	32 (84)	8 (21)	57 (4-155)	18 (47)	75 (27-142)	6 (16)	2 (0-8)	
All (458)	417 (91)	142 (31)	20 (5-78)	188 (41)	37 (12-81)	86 (19)	6 (1-31)	

Survival presented as median months (IQR).

[†] $p = 0.01$ (NIV vs. weaned)[†]

* PaCO₂ on discharge = 6.5kPa in NIV group, 5.9kPa in ventilator-free group.

S136

AN OBSERVATIONAL COHORT STUDY TO DETERMINE THE SAFETY, EFFICACY AND OUTCOME OF THE EARLY INITIATION OF PRESSURE SUPPORT VENTILATION DURING MECHANICAL VENTILATION

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Introduction Identifying the earliest time for initiation of weaning from mechanical ventilation (MV) is important. Weaning trials and guidelines apply screening criteria which have not been validated and which may actually delay weaning from MV if too

Abstract S136 Table 1. Physiological parameters and organ support at initiation of pressure support ventilation

Neurological	
RASS	-2 (-2- -3)
RASS = -5 (%)	2 (1)
RASS = -4 (%)	18 (9)
RASS = -3 (%)	70 (34)
Sedation in 24hrs prior to PSV	730 (240-1690)
Propofol, mg	400 (0-1175)
Fentanyl, mcg	
Respiratory	
PaO ₂ :FiO ₂ ratio (kPa)	35.8 ± 15.9
PEEP (cmH ₂ O)	7.5 ± 2.5
pH	7.35 ± 0.07
PaCO ₂ (kPa)	5.7 ± 1.3
Cardiovascular	
Heart rate (bpm)	88 ± 17
Mean arterial pressure (mmHg)	77 ± 11
Requiring vasoactive drugs (%)	88 (42)
SOFA^a	
SOFA (total)	6 (4-8)
Respiratory	1 (1-3)
Cardiovascular	1 (1-3)
Renal	0 (0-2)
Hepatic	1 (0-1)
Haematological	0 (0-2)
Glasgow Coma Scale ^b	0 (0-0)

Data are presented as percentage (%), mean ± standard deviation or median (Interquartile range). n = 209, except ^a n = 199. ^b assumed GCS not accounting for sedation.

Abbreviations: RASS = Richmond Agitation and Sedation Scale. PSV = pressure support ventilation. PaO₂ = arterial partial pressure of oxygen. FiO₂ = fraction of inspired oxygen. PEEP = positive end expiratory pressure. PaCO₂ = arterial partial pressure of carbon dioxide. SOFA = sequential organ failure assessment.

prescriptive. This study aimed to observe physician-led utilisation of pressure support ventilation (PSV), referenced to four screening criteria commonly reported in weaning trials (PaO₂:FiO₂ ≥26.3kPa, positive end expiratory pressure (PEEP) ≤5cmH₂O, Richmond Agitation and Sedation Scale (RASS) >-3 and cardiovascular stability (HR <120, MAP >65mmHg and no inopressor support)), hypothesising that these criteria would not predict ability to sustain a PSV trial for 24hours.

Method Prospective observational cohort study of adult patients receiving MV in a thirty-bed ICU in a university hospital. Routine post-operative patients were excluded. Logistic regression analysis identified factors associated with PSV failure. Outcome is reported according to adherence to the screening criteria.

Results 209 patients were included (mean ± SD age 62.6 ± 15.9years, M:F 115:94, APACHE II 16.7 ± 6.1, 48% medical, 20% elective surgical, 32% emergency surgical admissions). Median (IQR) time to initiate PSV was 11.0 (5.0-22.0) hours, and duration of weaning to extubation was 43.0 (13.0-121.5)hours. PSV weaning was initiated despite significant hypoxia (PaO₂:FiO₂ 35.8 ± 15.9kPa), moderate PEEP levels (7.5 ± 2.5cmH₂O), deep sedation (44% RASS≤-3) and cardiovascular instability (48.8%) (Table 1). At PSV initiation, 85% of patients violated at least one screening criterion, yet 74.6% of patients remained stable for 24 hours. Logistic regression identified no association between individual screening criteria and PSV failure. Failure to sustain a PSV trial was associated with ventilation >7 days (RR = 2.12 [1.33, 3.38] $p = 0.002$) and ICU mortality (RR = 2.94 [1.46, 5.94] $p = 0.002$).

Conclusion Physician-led PSV weaning was often initiated early before patients fulfilled conventional screening criteria. Despite