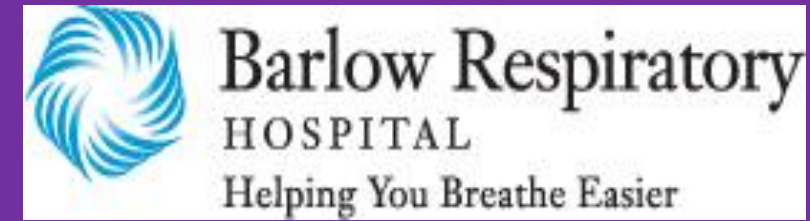


# Post-ICU Mechanical Ventilation: Extended Care Facility Residents

## Transferred from Intensive Care to Long-Term Acute Care

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### INTRODUCTION

For more than three decades, patients who fail to wean in the intensive care unit (ICU), becoming dependent on mechanical ventilation, have been transferred to long-term care hospitals for continued attempts at weaning from prolonged mechanical ventilation (PMV). Barlow Respiratory Hospital (BRH) is a 105-bed long-term acute care (LTAC) hospital network that has functioned as a regional weaning center, accepting chronically critically ill (CCI) patients transferred from the ICUs of hospitals in Southern California. Specifically, outcomes of primarily vulnerable elders residing in extended care facilities (nursing homes, skilled nursing facilities, subacute facilities) prior to ICU admission have not been reported.

Herein we report patient characteristics, weaning outcomes, discharge status and disposition, and post-discharge survival of a cohort of patients with pre-morbid residence of an extended care facility (ECF).

### METHODS

The Ventilation Outcomes Database (VOD) was queried for patients with pre-morbid location of ECF. VOD data were collected by trained personnel from transfer records and BRH medical records; custom queries were constructed to obtain electronic medical record (EMR) data. Weaning outcomes (weaned, ventilator-dependent, died) were scored at discharge. Social Security Death Index (SSDI) determined post-discharge survival. Pre-morbid functional status was determined using the Zubrod score (0 = Fully active to 4 = Bedridden with no self-care). Zubrod scores of 0-2 were deemed "good" functional status; scores of 3-4 were "poor" functional status.

### RESULTS

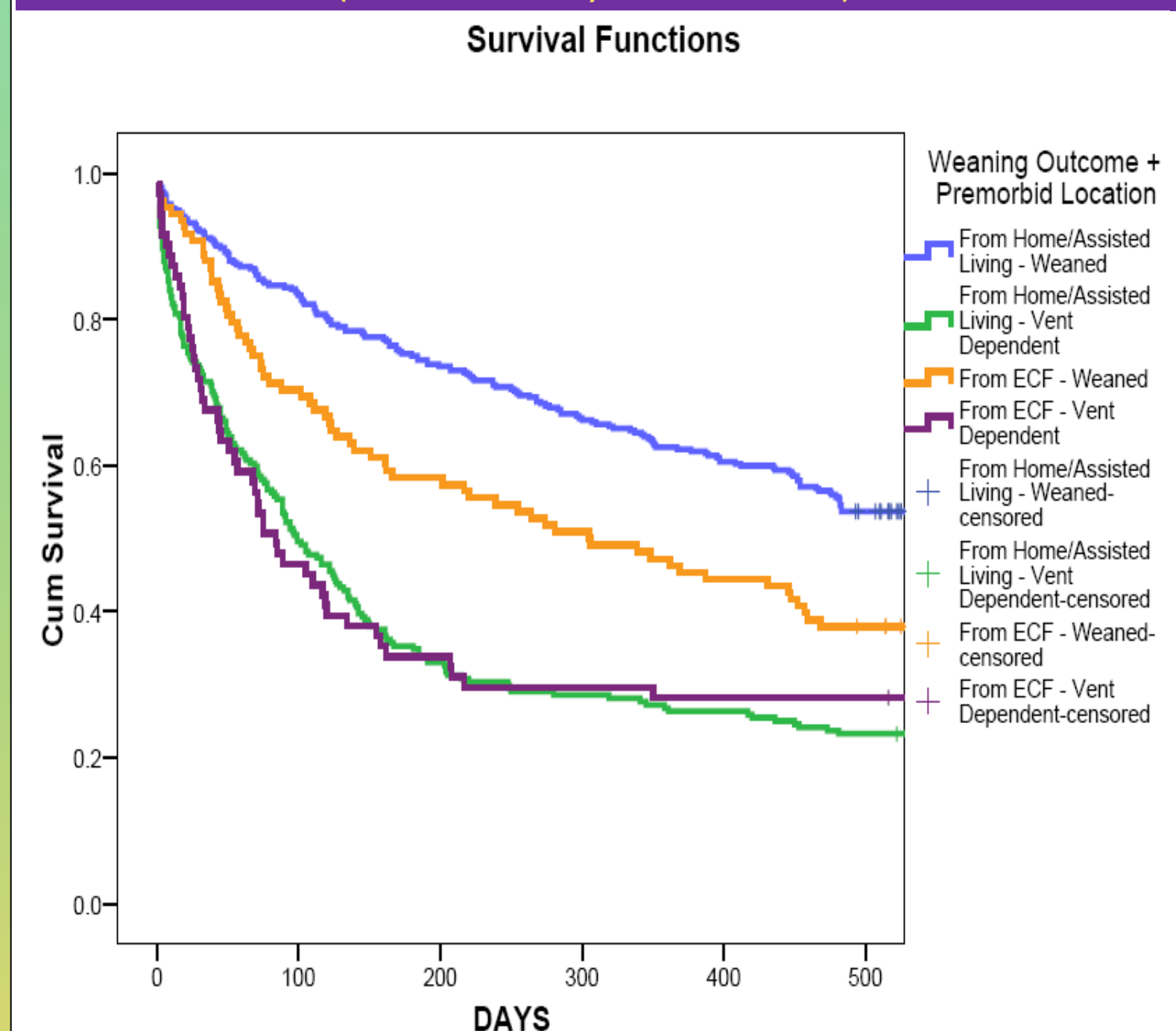
There were 872 patients discharged from BRH 4/1/07 – 12/31/09 who were admitted for weaning from PMV. 201/872 (23.1%) had pre-morbid residence of an ECF. Table 1 summarizes admission data by pre-morbid location.

**Table 1**  
Selected Characteristics of Patients on Admission: Comparison Analysis of Pre-morbid Location<sup>†</sup>

Characteristics	From ECF (n=201)	From Home or Assisted Living (n=665)	p <sup>‡</sup>
Age, years	74 [22 - 99]	72 [19 - 102]	ns
Gender, male	46%	54%	0.03 <sup>c</sup>
Pre-morbid functional status, good	6%	71%	<0.001 <sup>c</sup>
Serum, albumin, g/dl	2.4 ± .58	2.4 ± 1.2	ns
Hematocrit (%)	31.7 ± 6.5	31.6 ± 11.6	ns
BUN, mg/dl	32.3 ± 24.1	30.0 ± 19.5	ns
Serum creatinine (mg/dl)	1.1 ± .88	1.0 ± .92	ns
APACHE III© APS	46 [23 - 93]	43 [14 - 93]	.02
Glasgow Coma Score	11 [3 - 15]	14 [3 - 15]	.03
Pressure ulceration ≥ stage II	58%	36%	<0.001 <sup>c</sup>
Race/Ethnicity			ns
African-American	14.5%	11.4%	
Asian/Pacific Islander	10.0%	11.0%	
Caucasian	52.2%	53.3%	
Hispanic/Latino(a)	21.4%	21.9%	
Other	1.9%	2.4%	

<sup>†</sup>Complete data available for 866 patients, <sup>‡</sup>ns=not significant, p>.05; <sup>c</sup>C=Chi Square

**Figure 1**  
16-Month Post-Discharge Survival  
(Outcome Stratified by Pre-morbid Location)\*



\*Kaplan-Meier Survival Curve  
p<.001, Log Rank Test (Mantel-Cox) for equality of survival distribution for the different levels of pre-morbid location and weaning outcome.

**Table 2**  
Weaning Outcomes, Discharge Status and Dispositions: Comparison of Pre-morbid Location

	From ECF (n=201)	Home (n=665)	p <sup>†</sup>
<b>Weaning Outcome</b>	<b>n (%)</b>	<b>n (%)</b>	<b>ns</b>
Weaned	108 (53.7)	352 (52.9)	
Tracheostomy retained	90.4%	69.1%	<.001 <sup>c</sup>
Ventilator-dependent	71 (35.3)	223 (33.5)	
Died	22 (10.9)	90 (13.5)	
Time to Wean, days	18 [3-131]	17 [1-119]	ns
Length of Stay, days	33 [1 - 299]	34 [1 - 327]	ns
<b>Discharge Dispositions (alive)</b>	<b>n=179</b>	<b>n=575<sup>‡</sup></b>	<b>ns</b>
<b>Discharge Location</b>			<b>&lt;.001<sup>c</sup></b>
Home/Assisted Living	8 (4.5)	74 (13.0)	
Extended Care Facilities	149 (83.2)	393 (68.9)	
Short-term Acute Care	22 (12.3)	103 (18.1)	
<b>Discharge Status (alive)</b>			
With Feeding Tube	93.5%	93.1%	ns
With Foley Catheter	81.5%	84.9%	ns
With Tracheostomy	92.6%	75.9%	<.001 <sup>c</sup>
12-month Post-DC Survival	70 (39.1)	276 (48.1)	<.04 <sup>c</sup>
12-month Post-Admit Survival	73 (36.3)	294 (44.3)	= .05
16-month Post-Admit Survival	64 (31.8)	264 (39.6)	<.04 <sup>c</sup>

<sup>†</sup>ns=not significant, p>.05; <sup>c</sup>C=Chi Square, <sup>‡</sup>5 patients with unknown discharge disposition

### CLINICAL IMPLICATIONS

Critical care seeks to ensure survival. If survival is achieved, the goal becomes to restore patients to pre-morbid functional status and living situation. But for the population of elderly patients already residing in ECFs with poor functional status, they return to facility care with further debility as a result of life-saving therapy, as evidenced by the status at discharge from the LTAC. These data may be useful in addressing quality of life issues, and improving communication and decision-making among elderly patients, their families, and physicians particularly when considering tracheotomy.

### REFERENCES

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**Table 3**  
Disposition at Discharge and 12-Month Survival by Pre-morbid Location and Outcome

From ECF n=179		From Home/Assisted Living n=575	
<b>Weaned</b> 108 (60.3)	<b>Vent Dependent</b> 71 (39.7)	<b>Weaned*</b> 352 (61.2)	<b>Vent Dependent</b> 223 (38.8)
Home 6 (5.6)	Home 2 (2.8)	Home 66 (19.0)	Home 8 (3.6)
ECF 96 (88.8)	ECF 53 (74.6)	ECF 259 (74.7)	ECF 134 (60.1)
Acute 6 (5.6)	Acute 16 (22.5)	Acute 22 (6.3)	Acute 81 (36.3)
<b>12-Month Post-Discharge Survival</b>			
<b>50 (46.3)</b>	<b>20 (28.2)</b>	<b>218 (61.9)</b>	<b>58 (26.0)</b>
<b>16-Month Post-Discharge Survival</b>			
<b>43 (39.8)</b>	<b>20 (28.2)</b>	<b>202 (57.4)</b>	<b>54 (24.2)</b>

\*Complete data available for 570 patients, data presented as n (%)

### COMMENTS AND CONCLUSIONS

- Patients with pre-morbid location of an ECF have accompanying poor pre-morbid functional status before their catastrophic illness, ICU experience, and PMV.
- These patients experienced weaning outcomes equal to those of patients living at home prior to PMV.
- The vast majority of surviving ECF residents returned to ECFs, now with the added burdens of ventilator dependency and/or tracheostomies, Foley catheters, and enteral feeding tubes.
- Nearly twice as many weaned patients survived 12-months post discharge compared to those discharged ventilator dependent.
- Assessing and interpreting functional status and quality of life at regular intervals in these patients is a particularly important challenge.
- Efforts to investigate predictors of PMV, weaning outcomes, and survival, such as: *age, gender, race, severity of illness, functional status, and co-morbid conditions* are clearly warranted in this population to inform decision-making regarding ICU admission and treatment as well as to facilitate early determination of goals of care.