

# Patients Intubated At Least 48 Hours in Critical Care Are At Risk for Inactivity and Isolation

Brett Koermer, SPT<sup>1</sup>; Lisa Delmedico, SPT<sup>1</sup>; Lindsay Southam, SPT<sup>1</sup>; Sarah Foley, SPT, ATC<sup>1</sup>; Kelly Hambrick, SPT<sup>1</sup>; Lauren Johnston, SPT<sup>1</sup>; Julie Thompson, PhD<sup>2</sup>; Valerie Sabol, NP, PhD<sup>2</sup>; Amy Pastva, PT, PhD<sup>1</sup>

<sup>1</sup>Doctor of Physical Therapy Division, Duke School of Medicine; <sup>2</sup>Duke University School of Nursing, Durham, NC, USA

## Background

- Patients who are critically ill, especially those requiring mechanical ventilation (MV) while in the intensive care unit (ICU), are at risk for short and long-term functional deficits. Increased levels of physical activity have been hypothesized to improve outcomes; however, to date, there is only one report describing physical activity patterns in this cohort and that report occurred outside the U.S. (Berney et al. 2015).

## Purpose

- Measure patterns of physical activity in a group of patients who are in critical care at an academic medical center in the U.S.

## Methods

- Single center observational behavioral mapping study of 47 patients admitted to the medical (n=18), surgical (n=6) or cardiothoracic (n=23) ICU at Duke University Hospital who were 18 yrs or older and required MV for at least 48 hrs.
- Observations occurred for 1 min, every 10 min over 15 hours (6AM-9PM). Patient location, persons present in room, and highest level of physical activity were recorded at each time point. A total of 3,463 observations were recorded, 3,302 (95.35%) while on MV and 161 (4.65%) while not on MV.
- Activity was qualified using the ICU Mobility Scale (IMS) scores and was further classified into no/minimal, low, moderate, or high activity categories.

**IMS** Reference: Hodgson, et al. (2014). Feasibility and inter-rater reliability of ICU Mobility Scale. *Heart & Lung*, 43, 19-24.

Observed Motor Activity	Activity Level
Lying in Bed	No/Minimal Activity
Passive ROM by staff	
Non-purposeful movement	
Purposeful UE movement	
Purposeful LE movement	
Sitting/Exercises in bed	Low Intensity
Sitting in chair	
Standing	Moderate Intensity
Moving from bed to chair	
Marching in place	
Walking with assistance of 1	High Intensity
Walking with assistance of 2	

### Statistical Analyses:

- Descriptive statistics described the patient sample.
- A Fisher's exact test compared activity restriction status to eligibility for PT.
- Chi-square tests compared activity levels across units.

## Outcomes

**Table 1: Patient Demographics.**

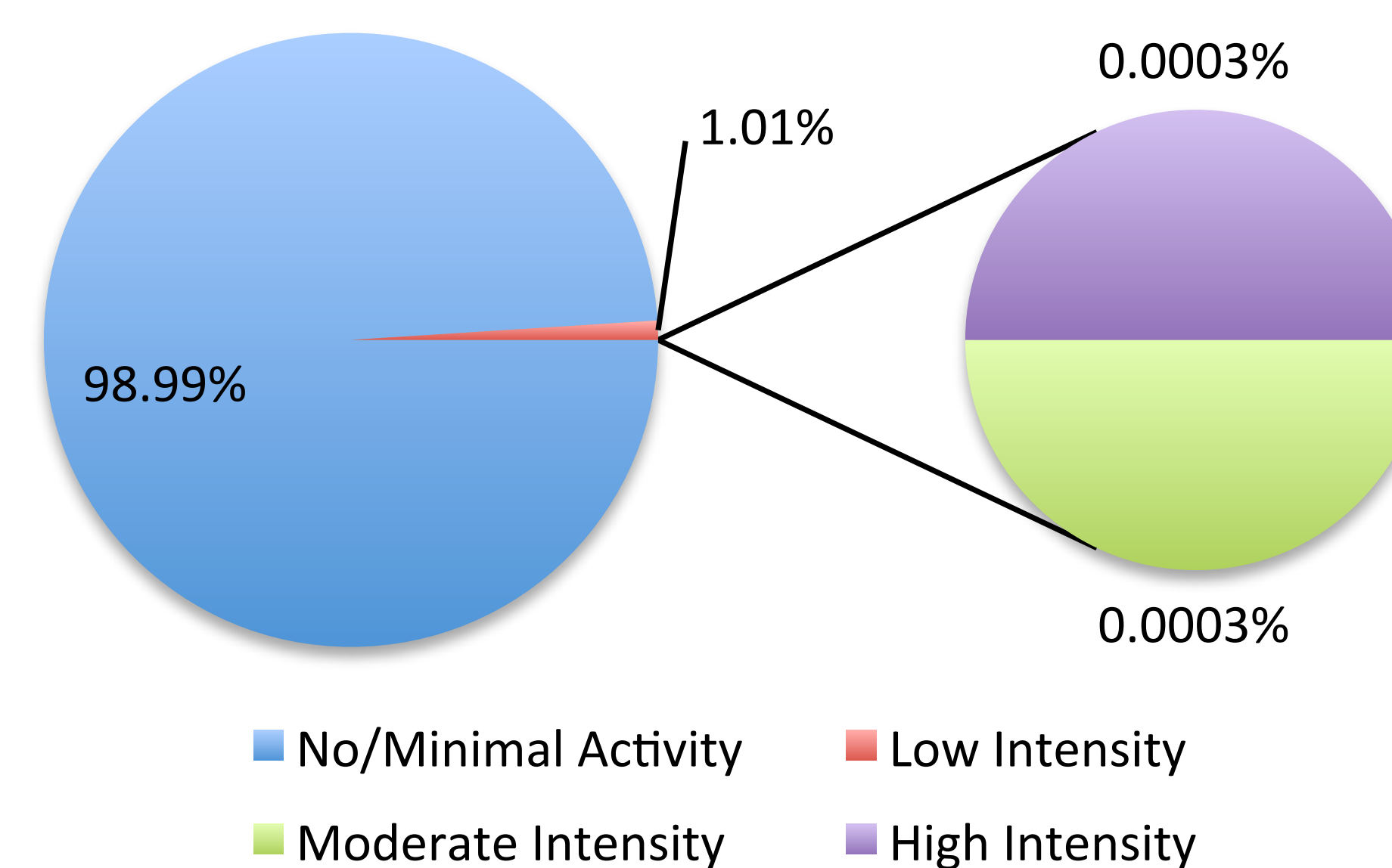
Age (mean ± SD)	54.57 ± 13.88
Sex (male) (%)	(31) 66%
APACHE II score (mean ± SD)	18.60 ± 5.74
SOFA score (mean ± SD)	7.55 ± 3.11
ICU length of stay (LOS) [median (IQR)]	7.00 (2-49)
MV days [median (IQR)]	7.00 (3-12)
Mobility eligible [RASS (Richmond Agitation Sedation Scale) +1 to -1], n (%)	22 (46.8%)
Medically restricted	30 (63.8%)
28 day mortality, n (%)	
Alive	32 (68.1%)
Deceased	15 (31.9%)

**Table 2: Patients were in bed for nearly all observations and spent nearly one-third of the 15-hour time period alone.**

Location and interaction	All (n=47)	Eligible		Restricted	
		Yes (n=21)	No (n=25)	Yes (n=30)	No (n=17)
Bed	100% (99%-100%)	100% (100%-100%)	100% (100%-100%)	100% (100%-100%)	100% (100%-100%)
In room	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)
In bathroom	nc	nc	nc	nc	nc
In chair	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)
Off unit	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)
Alone	29% (15%-48%)	24% (17%-39%)	33% (15%-49%)	32% (21%-48%)	19% (6%-39%)
Family	22% (6%-63%)	28% (1%-73%)	19% (8%-47%)	13% (4%-34%)	47% (26%-77%)
Nursing	45% (32%-62%)	44% (31%-62%)	47% (36%-61%)	50% (34%-61%)	40% (31%-63%)
Medical	3% (0%-5%)	1% (0%-5%)	3% (0%-5%)	3% (1%-5%)	1% (0%-4%)
PT	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)	0% (0%-0%)

Data presented as median [IQR]

**Figure 1: Patients rarely engaged in physical activity.**



## Outcomes

**Table 3: Patients may have been inappropriately restricted from physical activity when otherwise eligible for mobility.**

Relationship between activity restriction and eligibility for mobility		Restricted		Total
		No	Yes	
Eligible	No	Count: 5	Count: 20	Count: 25
	No	% within Restricted: 29.4%	% within Restricted: 69.0%	% within Restricted: 54.3%
Eligible	Yes	Count: 12	Count: 9	Count: 21
	Yes	% within Restricted: 70.6%	% within Restricted: 31.0%	% within Restricted: 45.7%
Total		Count: 17	Count: 29	Count: 46
Total		% within Restricted: 100.0%	% within Restricted: 100.0%	% within Restricted: 100.0%

**Table 4: Despite similar characteristics (age, illness severity, sedation level, LOS), patients in SICU were more active.**

Cross unit comparison	Patient Unit			p-value
	MICU	SICU	CTICU	
# Patients Observed	18	6	23	
No/minimal intensity, n (%)	1348 (99.93%)	427 (95%)	1638 (98.3%)	<0.001
Low Intensity, n (%)	1 (0.07%)	23 (5%)	11 (1.0%)	<0.001
Moderate Intensity, n (%)	0 (0%)	0 (0%)	1 (0.07%)	0.59
High Intensity, n (%)	0 (0%)	0 (0%)	1 (0.07%)	0.59

## Conclusions

- In agreement with the previous report, **patients in critical care are minimally active and relatively isolated**. Characteristics such as age, illness severity, sedation level, and LOS had limited utility in predicting activity levels.
- Despite the hypothesized benefits of physical activity, **limited amounts of time in either incidental or structured activity, even in those eligible for mobility**, places patients who are critically ill at-risk for short and long-term functional deficits.
- To address these disparities, strategies to foster a culture of physical activity and interaction in the critical care setting are required.**

## References

Berney SC, Rose JW, Bernhardt J, Denehy L. *Journal of critical care*. 2015;30(4):658-663.  
 Connolly B, Salisbury L, O'Neil B, et al. *Cochrane Database Syst Rev*. 2015;(5):CD008632.  
 Walsh CJ, Batt J, Herridge MS, Dos Santos CC. *Clin Chest Med*. 2014;35:811-826.