



BACKGROUND

- ASPEN guidelines recommend 15-20 kcal/kg actual body weight and 1.2-2.0 g protein/kg body weight for the first week of critical care¹; others recommend advancing up to 25kcal/kg and 1.3 g protein/kg²
- NIH COVID-19 Treatment Guidelines Panel states there is insufficient data either for or against the use of vitamin C, vitamin D or zinc for the treatment of COVID-19³
- Prior research on relationships between micronutrients and patient outcomes among vented, critically ill patients have been mixed.

OBJECTIVE

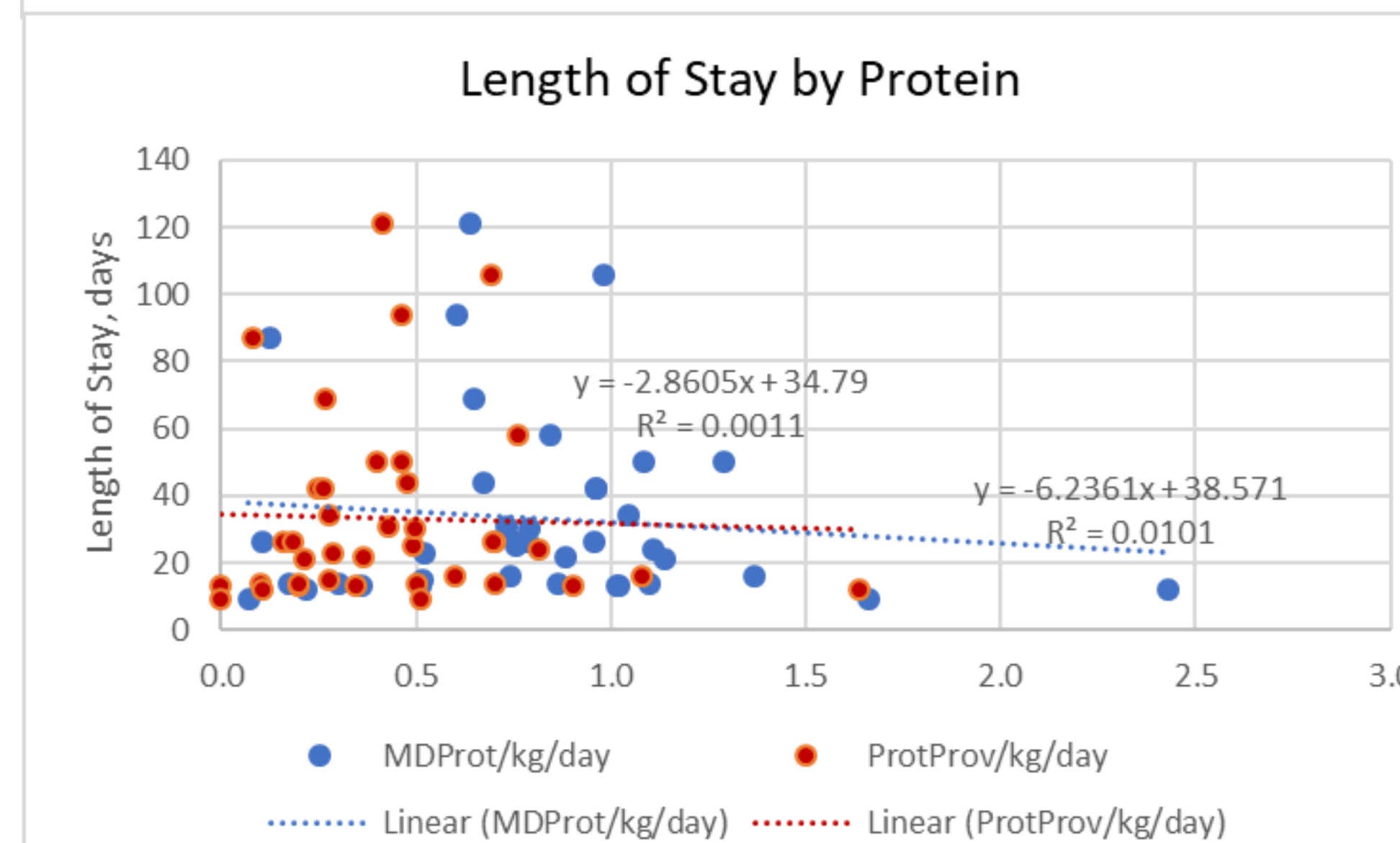
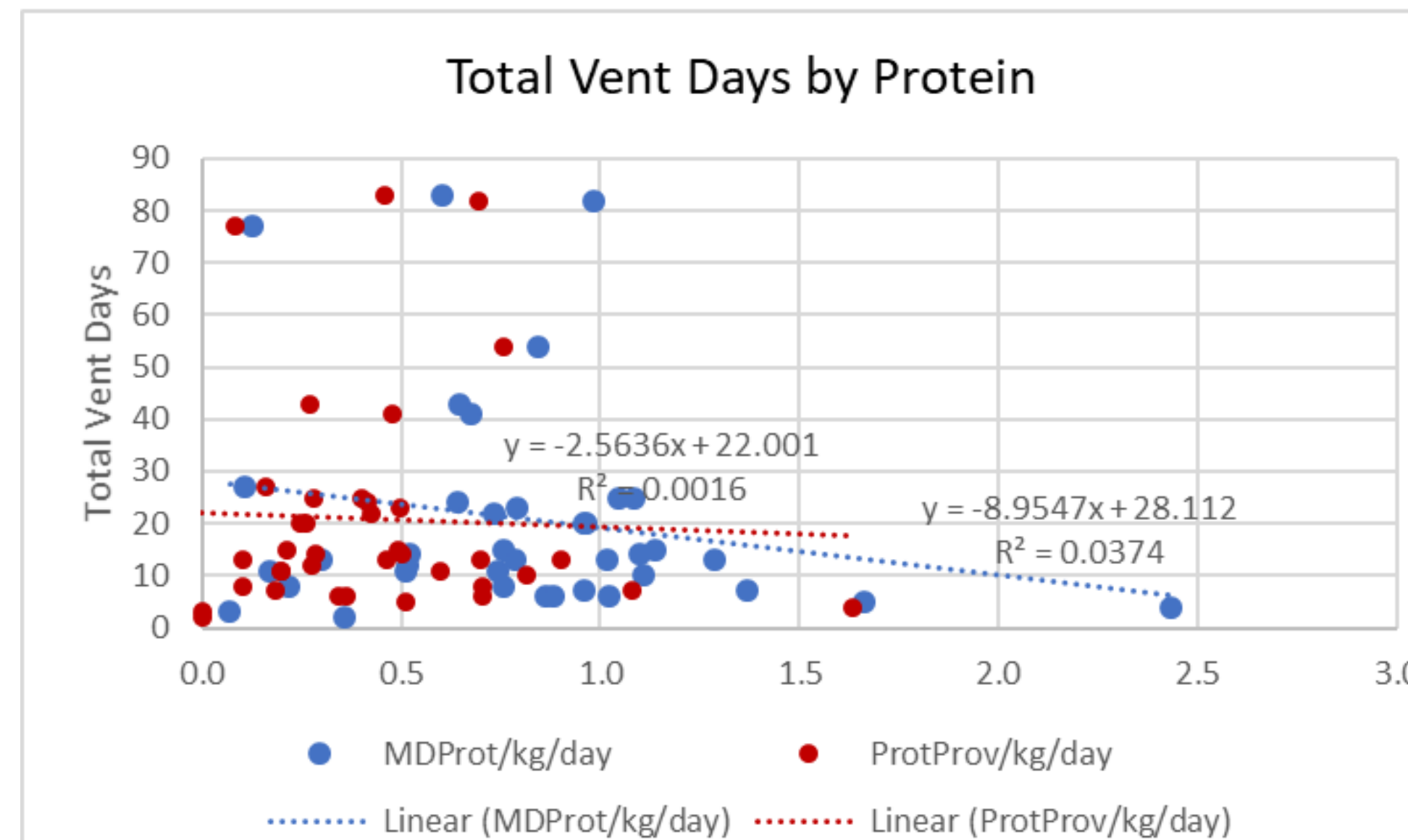
- To determine relationships between macronutrients and outcomes, such as ventilator days, inflammation and length of stay (LOS), that may confound relationships between micronutrients delivered to tube fed, vented, COVID-19 patients

METHODS

- A convenience sample was identified by CBORD tube feeding reports primarily in Spring 2020
- Inclusion criteria – over 18 years old, exclusively tube fed and vented
- Exclusion criteria – patients with cancer, kidney disease or pregnancy
- Charts were scrutinized for the following data for the first 7 days of mechanical ventilation: MD orders, I's/O's for formula delivered, MAR for propofol, Prostat and micronutrients, labs for CRP, IL-6, ferritin, BUN/cr and vitamin D
- Based on this data the following was calculated: vent days, LOS, nutrients ordered and delivered from feedings and supplementation

RESULTS

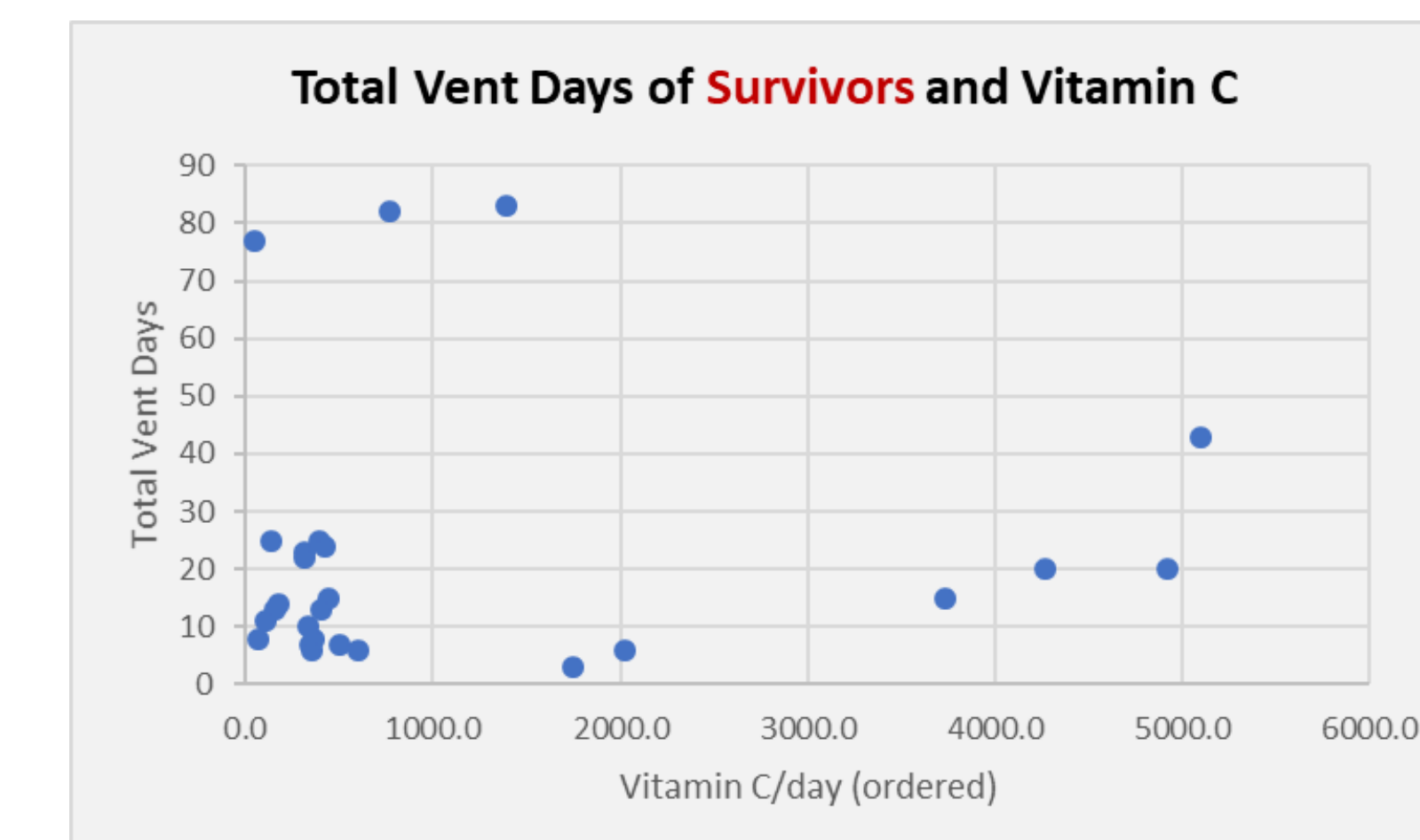
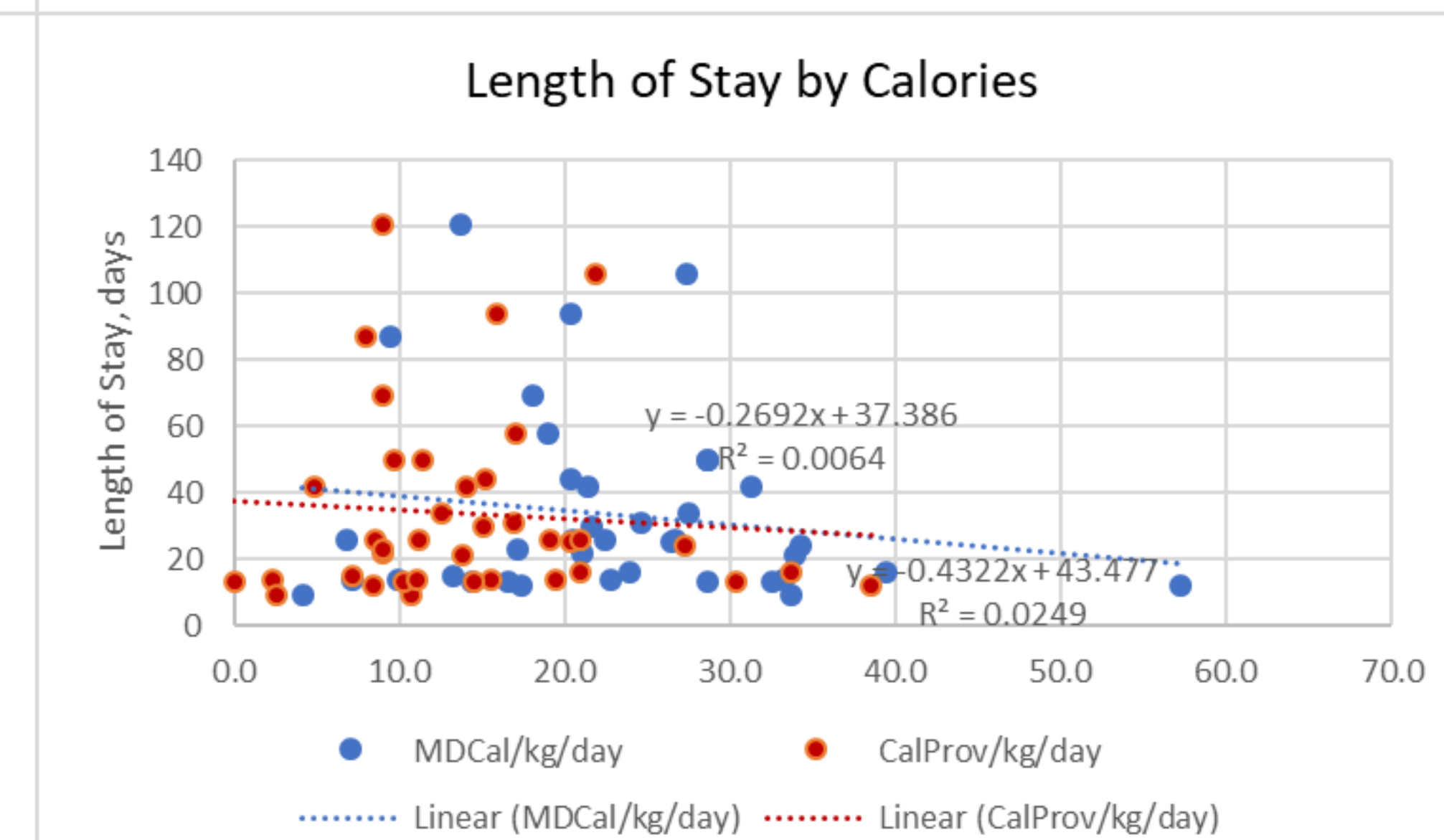
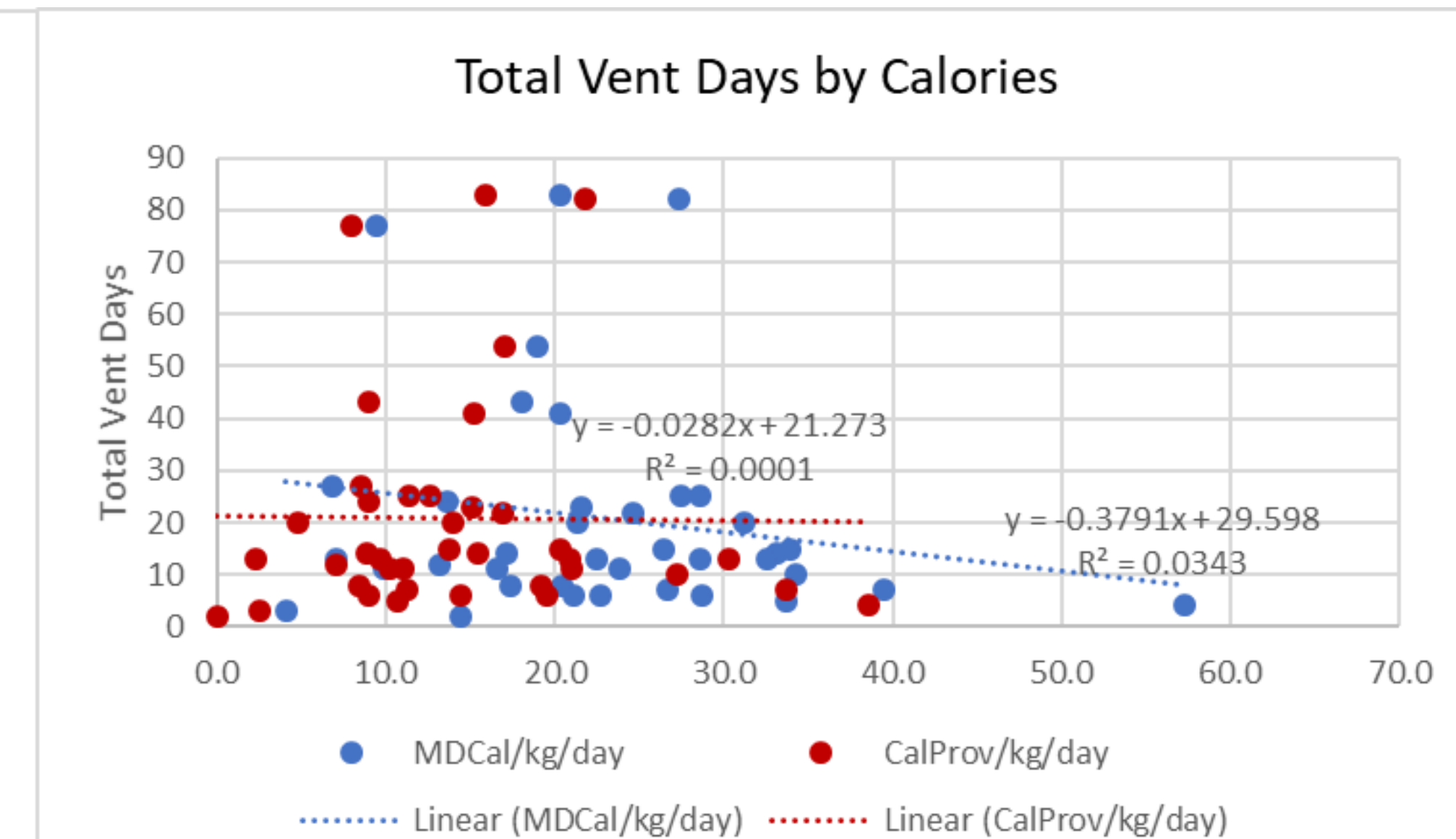
Patient Characteristics (n=38)	
Gender (M, F)	24 (63%), 14 (37%)
Age	62 ± 16
BMI*	32 ± 7
Smoking Status (never, current, history)**	26 (70%), 1 (3%), 10 (27%)
Race	
Caucasian	16 (42%)
Black	4 (11%)
Other/unspecified	18 (47%)
Ethnicity	
Non-hispanic	19 (50%)
Hispanic	9 (24%)
Unspecified	10 (26%)
Disposition	
Deceased	12 (32%)
Discharged to home	22 (58%)
Discharged to rehab	4 (11%)
Co-morbidities	
Diabetes (no, type 1, type 2, unspecified)	19 (50%), 5 (13%), 7 (18%), 7 (18%)
Hypertension (N, Y)	15(39%), 23 (61%)
*n=36	
**n=37	



RESULTS

Independent Variables	All Patients	Expired Patients	Surviving Patients
	<i>Ordered</i>		
Calories, kg/day	23.0 ± 10.3	22.0 ± 14.7	23.5 ± 7.7
Protein, g/kg/day	0.8 ± 0.5	0.8 ± 0.7	0.8 ± 0.3
Vitamin C, mg/day	983 ± 1331.2	661.3 ± 506.7	1131.4 ± 1561.1
Vitamin D, mcg/day	19.6 ± 13.9	15.8 ± 11.1	21.3 ± 14.9
<i>Delivered (estimated by I/Os)</i>			
Calories, kg/day	14.3 ± 8.3	13.9 ± 11.0	14.5 ± 7.1
Protein, g/kg/day	0.4 ± 0.3	0.5 ± 0.5	0.4 ± 0.3
Vitamin C, mg/day	880.1 ± 1331.1	577.9 ± 509.7	1019.6 ± 1563.3
Vitamin D, mcg/day	12.9 ± 11.4	10.2 ± 8.3	14.1 ± 12.5
Dependent Variables			
Length of Stay, days	33.5 ± 28.1	20.4 ± 15.1	39.6 ± 30.8
Total Vent Days	20.9 ± 21.0	17.3 ± 15.7	22.5 ± 23.1
CRP Change*	3.8 ± 14.1	4.6 ± 10.3	3.5 ± 15.6

* higher numbers indicate greater reduction



CONCLUSION

- Lack of consistency of prior findings may be due to the underlying relationships between macronutrients delivered (which is challenging to assess) and patient outcomes
- After controlling for calorie and protein ordered/delivered, micronutrients ordered/delivered were not significantly related to outcomes in this data set.
- However, some data suggests a relationship between micronutrients and patient outcomes that may be confounded by suboptimal calorie and protein delivery
- Additional research, including a patient population with provision of protein and vitamin C according to current recommendations, will allow for further exploration of relationships between micronutrients and patient outcomes, controlling for macronutrient delivery.
- **Limitations**
 - Few patients receiving >1,000 mg Vitamin C/day
 - Lack of information of vitamin D status
 - Method of estimating volume of formula provided in midst of early COVID pandemic
 - Small sample size

References
1. Merendino R, Patel J, Taylor, B., Warren, M., McClave, S., Nutrition Therapy in the Patient with COVID-19 Disease Requiring ICU Care, Soc Crit Care Med, Updated April 1, 2020.
2. Thibault R, Feguin, P., Tamon, F., Pichard, C., Singer, P., Nutrition of the COVID-19 patient in the ICU: a practical guidance, Crit Care, 2020 24:447.
3. Covid19treatmentguidelines.nih.gov/supplements/Database online Bethesda, MD:NIH, 2021, Updated February 11, 2021

ACKNOWLEDGEMENTS

Stony Brook Dietetic Internship
Class of 2020-2021