The Effects of Altitude on Resting Metabolic Rate at 3,048m and 0m
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INTRODUCTION
There is debate on whether resting metabolic rate (RMR) is increased or decreased at altitude. RMR is energy expended by the body at rest to maintain basic function and gives insight into an individual's energy availability. The purpose of this study was to determine the effects of RMR at 3,048m and 0m. It was expected that RMR would increase at 3,048m.

METHODS
Four, college aged female subjects who met ACSM guidelines for physical activity were asked to perform two RMR tests at 3,048m and 0m in the Darwin Environmental Chamber. RMR was measured using a Parvo Medics TrueOne 2400 metabolic cart. The metabolic cart was placed inside the chamber and was calibrated before testing. Measurements were made in a randomized cross over fashion where each RMR test was done at the same time, on the same day, one week apart. Each subjects VO2 and respiratory exchange ratio (RER) were measured in each condition for 30 minutes, which was simulated in an environmental chamber where O2 levels were either increased or decreased for 3,048 and 0m respectively. Subjects were asked to fast for 8-10 hours, abstain from physical activity for 24 hours, and abstain from alcohol, nicotine, or tobacco.

RESULTS AND DISCUSSION
We concluded that two subject had a significantly higher VO2 and RER at 0m, however one subject had a significantly higher VO2 and RER at 3,048m (p<0.05). Group analysis demonstrated that only one subject had a higher mean VO2 at 0m (p<0.05), whereas two subjects had a lower mean VO2 at 0m (p<0.05). Two subjects had a higher mean RER at 0m, however, another had a lower mean RER at 0m (p<0.05). We hypothesized that RMR would be higher at 3,048m than at 0m due to the body requiring more energy to run metabolic processes with less oxygen. These differences were determined measuring VO2 and RER in the Darwin Environmental Chamber, which simulates different elevations by changing O2. The results from this study demonstrated that RMR was significantly higher at 0m than at 3,048m. Using simulated altitudes versus terrestrial altitudes could explain these results. The chamber decreases O2 levels as altitude increases, therefore causing RMR to be higher at 0m. RMR at 0m was likely higher because there was more oxygen available in the chamber.

CONCLUSIONS
Differences in resting metabolic rate varied between subjects. We found that RMR was higher at 0m than at 3,048m, unlike what we hypothesized. When simulating various altitudes using changes in O2 levels, it is important to calibrate to the appropriate O2% in addition to closely monitoring changes throughout the testing. Future research should consider these complications or perform measurements at terrestrial elevation where O2 levels do not change based on altitude.