Measuring Tidal Volumes

Breast Pump Ventilator Team

Brandi Gerstner, Grant Gerstner, Alex Scott, Rachel LaBatt

31 Mar 2020

Measuring Tidal Volumes

We had to take measurements of the amount of intermittent positive pressure delivered to the lungs during an inhale. We used water weight displacement to understand how many mL of air was delivered in one breath. We used a Taylor Silver Glass Digital Kitchen Scale (model number 5252661) as our scale. Before each test, we placed an empty bucket with on the scale then zeroized the weight. We then placed a glass container, with a balloon inside, on top of the bucket. We added water to the glass until it reached 790.

We programmed the ventilator to run for a specified amount of time depending on the respiratory rate and Inhalation:Exhalation ratio. The air blown into the balloon would displace water from the glass container into the bucket on the scale. Once the glass container is removed, we are left with the weight of the displaced water in grams. 1 gram is equal to 1 mL, making the conversion easy. Each measurement was taken 3 to 4 times and the average of the measured values is plotted above. The average flow rate is also presented as the average displaced volume over the breath time. Below are the graphs and photos of the test setup:





