

Chem in Medicine: Critical Needs for Human Calorimetry in Medicine

68) A person on a mechanical respirator cannot be overfed or underfed. If they are underfed, they will be malnourished which can lead to coma and death. If they are overfed, oxygen consumption increases and the ventilator and lungs must work harder.

69) Yes, the products are the same. Combustion of food in a calorimeter and by human body produce carbon dioxide, water, and energy.

70) Direct calorimetry places an individual in a human calorimeter and measures the heat radiated from them. Indirect calorimetry measures a patient's oxygen uptake. Direct calorimetry is the gold standard. Indirect calorimetry is the more practical method since the patient only needs to use a spirometer to measure the oxygen uptake, rather than a human calorimeter that requires considerable cost, time, and engineering skills.

71) Spirometry measures a patient's oxygen uptake. A patient breathes in 100% oxygen from a prefilled spirometer. The patient continues to re-breathe oxygen. Gases exhaled from the patient includes carbon dioxide and unused oxygen. The exhaled carbon dioxide is removed, and the amount of oxygen uptake is determined by the decrease in volume of the spirometer.