

# European Respiratory Society Annual Congress 2013

**Abstract Number:** 5376

**Publication Number:** P3857

**Abstract Group:** 2.2. Noninvasive Ventilatory Support

**Keyword 1:** Ventilation/NIV **Keyword 2:** Monitoring **Keyword 3:** Mechanical ventilation

**Title:** Effect of non-linear leaks on the monitoring accuracy of home mechanical ventilators: A bench study

Dr. Ana 26865 Sogo asogo@hotmail.com MD <sup>1</sup>, Prof. Dr Manel 26866 Luján mlujan@tauli.cat MD <sup>1,3</sup>, Mr. Jaume 26867 Montanyà jmontanya@tauli.cat <sup>2</sup>, Prof. Dr Eduard 26868 Monsó emonso@tauli.cat <sup>1,3</sup>, Dr. Xavier 26869 Pomares jpomares@tauli.cat <sup>1</sup> and Prof. Dr Lluís 31792 Blanch lblanch@tauli.cat <sup>3,4</sup>. <sup>1</sup> Pulmonology, Corporació Sanitària Parc Taulí, Sabadell, Barcelona, Spain, 08208 ; <sup>2</sup> Better Care S.L., Fundació Parc Taulí, Sabadell, Barcelona, Spain, 08208 ; <sup>3</sup> Pulmonology, CIBERES, Barcelona, Spain and <sup>4</sup> Critical Care, Corporació Parc Taulí, Sabadell, Barcelona, Spain, 08208 .

**Body:** Accuracy of tidal volume(VT)and leak measures provided by built-in software commercial ventilators has only been tested using bench linear models with fixed calibrated and continuous leaks.Objective:To assess the reliability of the estimation of tidal volume(VT)and unintentional leaks in a bench model with non-linear leaks during inspiratory or expiratory phases.Methods:Built-in software of four commercial ventilators and a fifth ventilator-independent ad hoc designed external software tool were tested with two level of leaks and two different models with excess leaks (inspiration or expiration).An external software analyzed separately inspiratory and expiratory unintentional leaks Results:In the model with inspiratory leaks,VT was overestimated by all four commercial software tools (values ranging from  $18.27\pm 7.05\%$  to  $35.92\pm 17.7\%$ )whereas the ventilator independent-software gave the smallest difference( $3.03\pm 2.6\%$ ).Leaks were underestimated by two applications(values of  $-11.47\pm 6.32$  and  $-5.9\pm 0.52$  L/min).With expiratory leaks,VT was overestimated by the software of one ventilator and the ventilator-independent software and significantly underestimated by the other three.The four commercial tools tested overestimated unintentional leaks,with values between  $2.19\pm 0.85$  to  $3.08\pm 0.43$  L/min.

**Conclusions:**Presence of non-linear leaks may be an important source of error in the measurement of VT and leaks provided by the software.