

1 **Combined effects of leaks, respiratory system properties and upper airway patency on**  
 2 **the performance of home ventilators: A bench study**

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6 **Additional File 1: Active lung model settings and simulated breathing patterns**

7 **Table S1-1. The settings of ASL5000 corresponding to the simulated respiratory diseases**

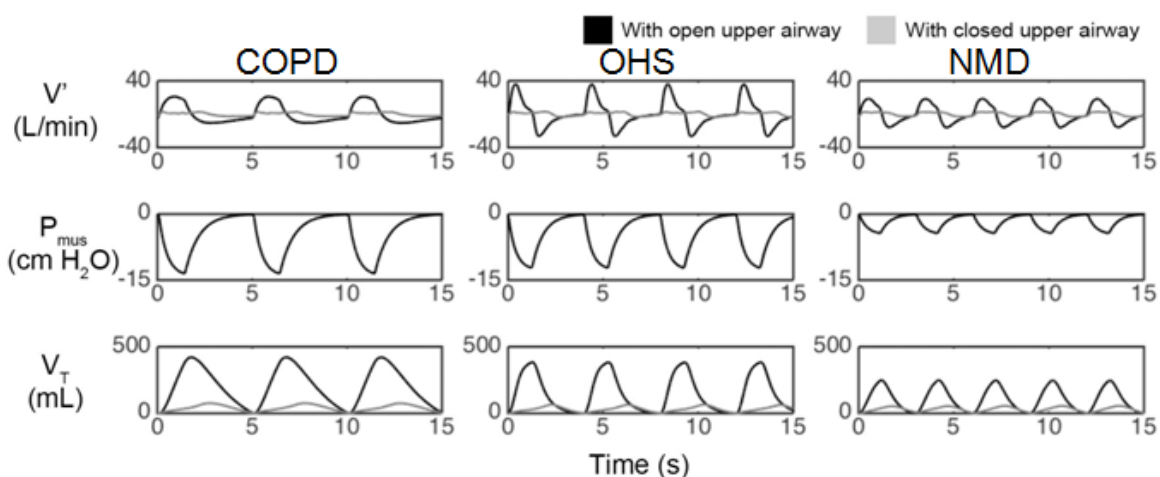
|  |             | COPD | OHS | NMD   |
|--|-------------|------|-----|-------|
| Resistance<br>( $\text{cmH}_2\text{O} \cdot \text{L} \cdot \text{s}^{-1}$ )* | Inspiration | 20   | 3   | 3     |
|  | Expiration  | 25   |     |       |
| Compliance ( $\text{ml} \cdot \text{cmH}_2\text{O}^{-1}$ )**                 |             | 50   | 30  | 60    |
| $P_{\text{mus}}$ at 0.1 second ( $\text{cmH}_2\text{O}$ )                    |             | 3    | 3   | 1     |
| $P_{\text{max}}$ ( $\text{cmH}_2\text{O}$ )                                  |             | 13   | 12  | 4.3   |
| Breathing rate (bpm)   |             | 12   | 15  | 20    |
| $T_I/T_E$  |             | 1/2  | 1/2 | 1/1.6 |

8 COPD: chronic obstructive pulmonary disease, OHS: obesity hypoventilation syndrome, NMD: neuromuscular  
 9 disorder.  $P_{\text{mus}}$ : inspiratory muscular pressure;  $P_{\text{max}}$ : maximum pressure drop during breathing cycle. bpm:  
 10 breath per minute;  $T_I$ : inspiratory time;  $T_E$ : expiratory time.

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12 \*Values of resistance of 5, 10, 20, and 50  $\text{cmH}_2\text{O}/\text{L}/\text{s}$  characterize absent, moderate, severe, and  
 13 extreme obstruction, respectively [Olivieri 2011].

14 \*\*Values of compliance of 100, 50, and 25  $\text{mL}/\text{cmH}_2\text{O}$  characterize absent, mild, and severe  
 15 restriction [Olivieri 2011]. Of note, since severe COPD is usually associated with hyperinflation and  
 16 the end-expiratory tidal volume is shifted forward the upper flat portion of the V-P relationship in  
 17 these patients.



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19 **Figure S1-1:** The simulated airflow ( $V'$ ), the corresponding inspiratory muscular pressure ( $P_{\text{mus}}$ ) and the  
 20 resulting tidal volume ( $V_T$ ) of the three lung diseases with open and closed upper airways. COPD: chronic  
 21 obstructive pulmonary disease; OHS: obesity hypoventilation syndrome; NMD: neuromuscular disorder.  
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23 Olivieri C, Costa R, Conti G, Navalesi P. Bench studies evaluating devices for non-invasive ventilation: critical  
 24 analysis and future perspectives. Intensive Care Med. 2011;38:160–7.