



**Supplementary Figure 7. Sensitivity to which lung model is used.**

$\dot{V}_{SWEEP}$  5 l/min in both lung models. In the constant  $\dot{V}_A$  lung model (left) and the standard ARDS lung model (right)  $P_aCO_2$  rises as  $\dot{Q}_{EC}$  falls, but the slope of the line is relatively flat at the  $\dot{Q}_{EC} > 2L/min$ . With both lung models  $P_aCO_2$  rises with increasing  $\frac{\dot{Q}_S}{\dot{Q}_T}$ , but there are differences in the rate of rise between the two models. Curves for  $\frac{\dot{Q}_S}{\dot{Q}_T} 1.0$  are identical in both lung models, as there is no pulmonary blood flow, so  $\dot{V}_A$  does not affect gas exchange. Curves for  $\frac{\dot{Q}_S}{\dot{Q}_T} 0$  are identical, as  $\dot{V}_A$  is the same in both models.