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Title: A bench study to investigate the effect of heated humidification on patient-ventilator asynchrony (PVA) in patients with chronic obstructive pulmonary disease (COPD) during non-invasive ventilation (NIV)

Dr. Swapna 5934 Mandal swapna.mandal@gstt.nhs.uk MD [1,2,3], Dr. Michelle 5935 Ramsay michelle.ramsay@gstt.nhs.uk [1,2,3], Dr. Eui-Sik 5936 Suh Eui-Sik.suh@gstt.nhs.uk [1,2,3], Prof. John 5937 Moxham john.moxhma@kcl.ac.uk [2] and Dr. Nicholas 5938 Hart nicholas.hart@gstt.nhs.uk [1,2,3,4]. [1] Lane Fox Clinical Respiratory Physiology Research Centre, Guy's & St Thomas' NHS Foundation Trust, London, United Kingdom ; [2] Division of Asthma, Allergy and Lung Biology, King's College London, London, United Kingdom ; [3] Lane Fox Respiratory Unit, Guy's & St Thomas' NHS Foundation Trust, London, United Kingdom and [4] NIHR Comprehensive Biomedical Research Centre, Guy's and St Thomas' NHS Foundation Trust and King's College London, London, United Kingdom .

Body: INTRODUCTION:The use of heated humidification(HH) during NIV is controversial. HH could increase patient-ventilator asynchrony (PVA) by increasing dead space and adversely affecting triggering. We hypothesised that HH would increase PVA, leading to increased neural respiratory drive (NRD) and patient discomfort. METHODS:12 COPD patients established on NIV were enrolled. 3 modes of NIV and humidification were applied in a random order: No humidification (NH); heated humidification (HH); and cold passover humidification (CH) (MR850 Fisher Paykel, NZ) for 30 minutes. Visual analogue scores (VAS), parasternal electromyography (EMGpara), mask pressure and respiratory inductance plethysmography were monitored throughout. RESULTS:8 males, mean age 70.9±7 years, and FEV1 0.68±0.33L were studied. The proportion of total asynchronies was greater in the CH arm (p=0.17), as was the proportion of patients with asynchrony index (AI) >10% (p=0.23, Figure 1). There were no differences in VAS comfort, oronasal dryness or synchronisation between the 3 groups. NRD decreased significantly between baseline and NH, however, there was no difference between the 3 modes of NIV and humidification(figure 1). CONCLUSION: HH does not increase PVA during NIV in COPD.