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Title: Reproducibility of non-invasive measures of arterial stiffness in mild to severe stable COPD using a new cuff-based operator independent device

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Body: Introduction COPD is associated with significant cardiovascular morbidity and mortality. Recent evidence suggests that treating COPD may improve arterial stiffness, a key determinant of cardiac risk. Endpoints with high reproducibility are desirable when assessing the impact of an intervention. A new cuff-based operator-independent device (Vicorder) has been developed for measuring arterial stiffness. Aims To assess pulse wave velocity (PWV) and augmentation index (AI) reproducibility, using the Vicorder device, in clinically stable COPD patients. Methods Between 27/11/12-15/2/12 repeat measurements of PWV and AI were made on 23 consecutive mild to severe stable COPD patients (12 males, 11 Females; Mean age 66±8 years; Mean predicted FEV1 50±19%), recruited from an inner-city teaching hospital out-patients. Results PWV mean = 8.9±1.2 m/s, mean difference = 0.035 m/s, Co-efficient of variation (COV) = 4% and limits of agreement (LOA) = -0.68 - +0.76m/s.

AI mean = 17.8±6.7 mmHg, mean difference = -0.7 mmHg, COV = 27.9% and LOA = -10.4 - +9.02 mmHg. Based on the above data, a sample size of 30 pairs would detect a change in PWV of 0.27 m/s with a power of 80%. Conclusion Vicorder measurements of PWV, but not AI, in stable COPD patients are highly reproducible and ideal for use in screening programmes and COPD research due to its operator independent non-invasive nature.