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**Title:** Can body mass index (BMI) predict the likelihood of nocturnal non-invasive home mechanical ventilation (HMV) re-admission rate in chronic hypercapnic chronic obstructive pulmonary disease (CHCOPD)?

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**Body:** There is increasing evidence HMV improves outcome in CHCOPD, including the avoidance of hospital admission. However, the determinants of readmission rate are yet to be identified. Methods: Retrospective cohort analysis of CHCOPD patients established on HMV between January 2010 and December 2011, comparing readmission rates due to acute hypercapnic respiratory failure (AHRF) against BMI over the course of one year. Indications for HMV were: symptomatic hypercapnia (arterial carbon dioxide (pCO<sub>2</sub>) >7–8 kPa), failure to wean after AHRF episode and/or 2 or more AHRF episodes over a 2 year period. Inspiratory pressures were titrated to achieve early morning pCO<sub>2</sub> <8kPa and oxygen saturations throughout the night >90% for at least 90% of the night. BMI was defined as normal-weight 20-24.9 kg/m<sup>2</sup> and overweight/obese (> 25.0 kg/m<sup>2</sup>). Results: 26 patients (male= 8, mean age= 66) with HCCOPD (mean FEV<sub>1</sub>/FVC 41.41 (SD +/- 13.10), mean FEV<sub>1</sub> 30.53% (SD 14.42), mean pCO<sub>2</sub> and bicarbonate 7.51kPa (SD +/- 0.95) and 31.65mmols/l (SD +/- 3.07) respectively) were established on HMV during the study period. 35 % had mean BMI 22.73 kg/m<sup>2</sup> (SD +/- 0.95) and 65% were overweight/obese (mean 36.49kgm<sup>2</sup>, SD +/- 9.38). The 1-year readmission rate was 6 admission/year in the normal-weight group and 0.35 (SD +/- 0.58) admissions/year in the overweight/obesity group (p <0.05). 100% normal-weight patients were at admitted at least once/year. Conclusion: BMI could be a determinant factor in the readmission rate in patients with CHCOPD initiated on HMV. Those with a higher BMI appear to have a lower chance of readmission.