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**Title:** Nocturnal hypercapnia in eucapnic obese patients With sleep disordered breathing (SDB)

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**Body:** Introduction:Obese patients with suspected SDB and hypercapnia are investigated with an arterial blood gas and overnight oximetry. We investigated the proportion of eucapnic obese patients who exhibit nocturnal hypercapnic respiratory failure.Method: Prospectively entered data from electronic patient record (Carevue, Philips, USA) from January 2012-December 2012 were analysed.Obese patients with suspected SDB attending for inpatient overnight transcutaneous carbon dioxide ($TcCO_2$) and oxygen saturation ($SpO_2$) monitoring were included.Results:44 patients were assessed, of which 29 (68%) exhibited daytime eucapnia with a bicarbonate level of 26(1.7)mmols/L.21% (6/29) were eucapnic day and night.79% (23/29) of these demonstrated nocturnal hypercapnia with a mean $TcCO_2$ of 6.5kpa and 75% of time spent with $TcCO_2$>6kpa. 15 (34%) were hypercapnic during the day and overnight, with a mean $TcCO_2$ of 6.8kPa and 81% of the time spent with a TcCO2 above 6kPa.

Conclusion:These data demonstrate that the majority of obese patients referred for assessment of SDB and nocturnal hypercapnia are eucapnic during the day. However, a significant percentage develop hypercapnia overnight. The daytime bicarbonate level was within normal limits, indicating that overnight carbon dioxide monitoring must be considered in obese patients with sleep disordered breathing and eucapnia.