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Title: Is it possible to predict ambulatory oxygen (AO) requirements?

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Body: Aim: To determine whether AO requirements on exertion can be predicted in patients with chronic lung disease. Background: The process for AO assessment as per current UK guidance (BTS/DoH 2006, PCC 2011) can be extremely time consuming, necessitating multiple walking tests with significant rest periods between walks. We set out to explore whether a simple model could accurately predict the AO flow rate required to abolish / minimise desaturation, potentially simplifying the process. Method: Retrospective data were analysed for all patients who attended AO clinic from April 2009 to January 2013. AO needs were assessed as per current guidance. For those who met the criteria for AO (n=100), diagnosis, age, baseline SpO₂, drop in SpO₂ on exertion and AO flow rate required to minimise this was recorded. Results: Multiple regression analysis was undertaken to test how well the variables included in the data could predict the likely level of AO required. A range of models were constructed and tested against the actual AO flow rate that had been required. The model which accounted for the greatest proportion of the variation in the data set (r=0.671) (F=79.40, p<0.05) included only one variable, the level of desaturation on room air following the walking test. Adding additional variable to the model, such as age, diagnosis and resting SpO₂ did not add significantly to the power of the model. Using this model, 91% of patients were predicted correctly within +/- 1L of the actual flow rate. Conclusion: Use of this model could reduce the number of walking tests required when performing AO assessment, saving both time and valuable healthcare resources.