

# Gas Diffusion Utility in the Diagnosis and Management of Acute Pulmonary Haemorrhage – A case study –

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## Introduction

The rate of uptake of carbon monoxide (CO) from alveolar gas is directly proportional to surface area of the alveolar-capillary interface and is inversely proportional to the distance CO molecules must travel to bind to haemoglobin (Hb) <sup>1,2</sup>

## Aim

Utilise gas diffusion to confirm presence of acute pulmonary haemorrhage and monitor progress of disease following commencement of treatment.

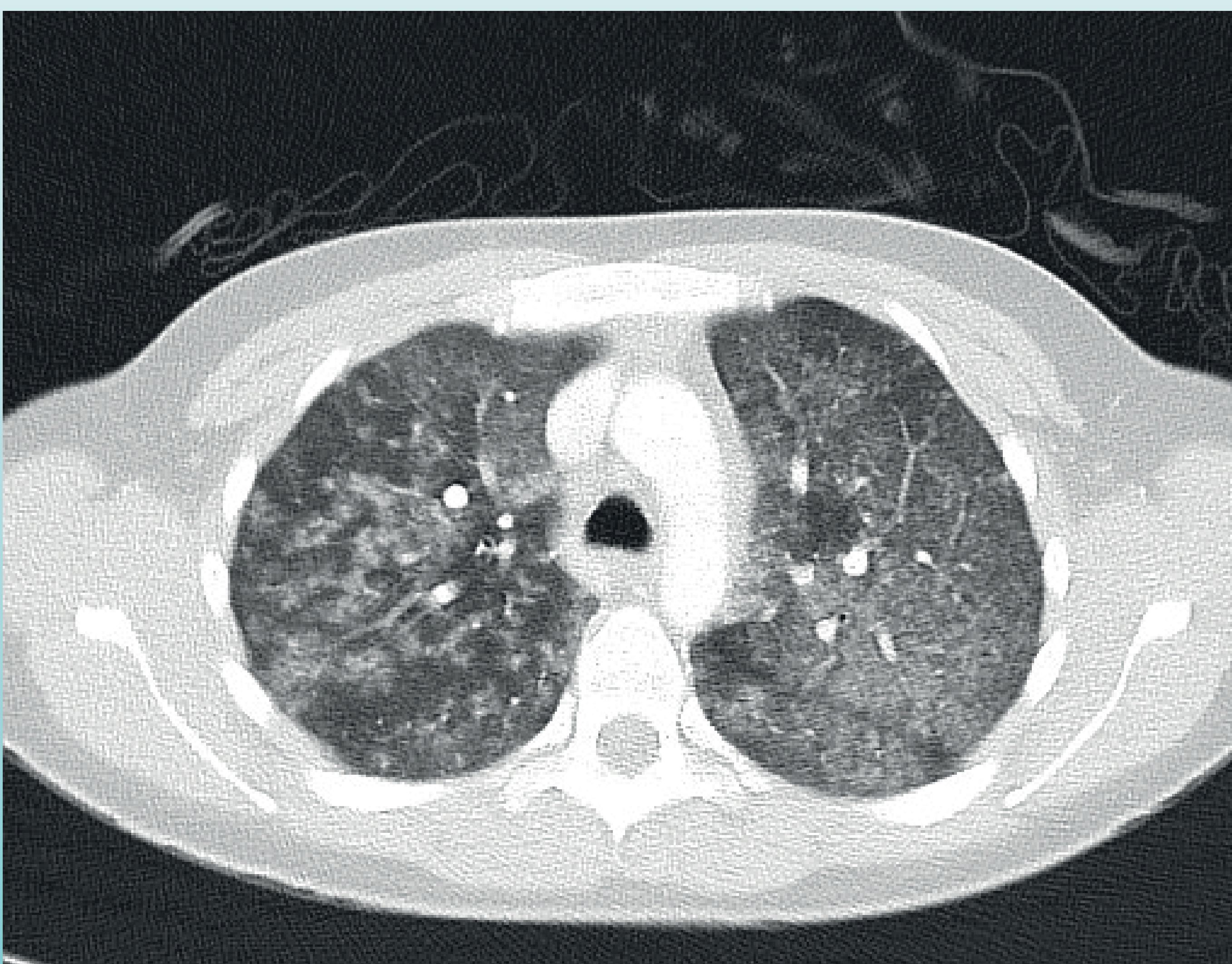
## Background

- 22 year old female presented with: cough, dyspnoea, haemoptysis and significant anaemia (Hb 6.0gm/dL).
- Later confirmed to be anti-glomerular basement membrane disease. Treatment commenced and gas diffusion utilised to monitor disease.

## Method

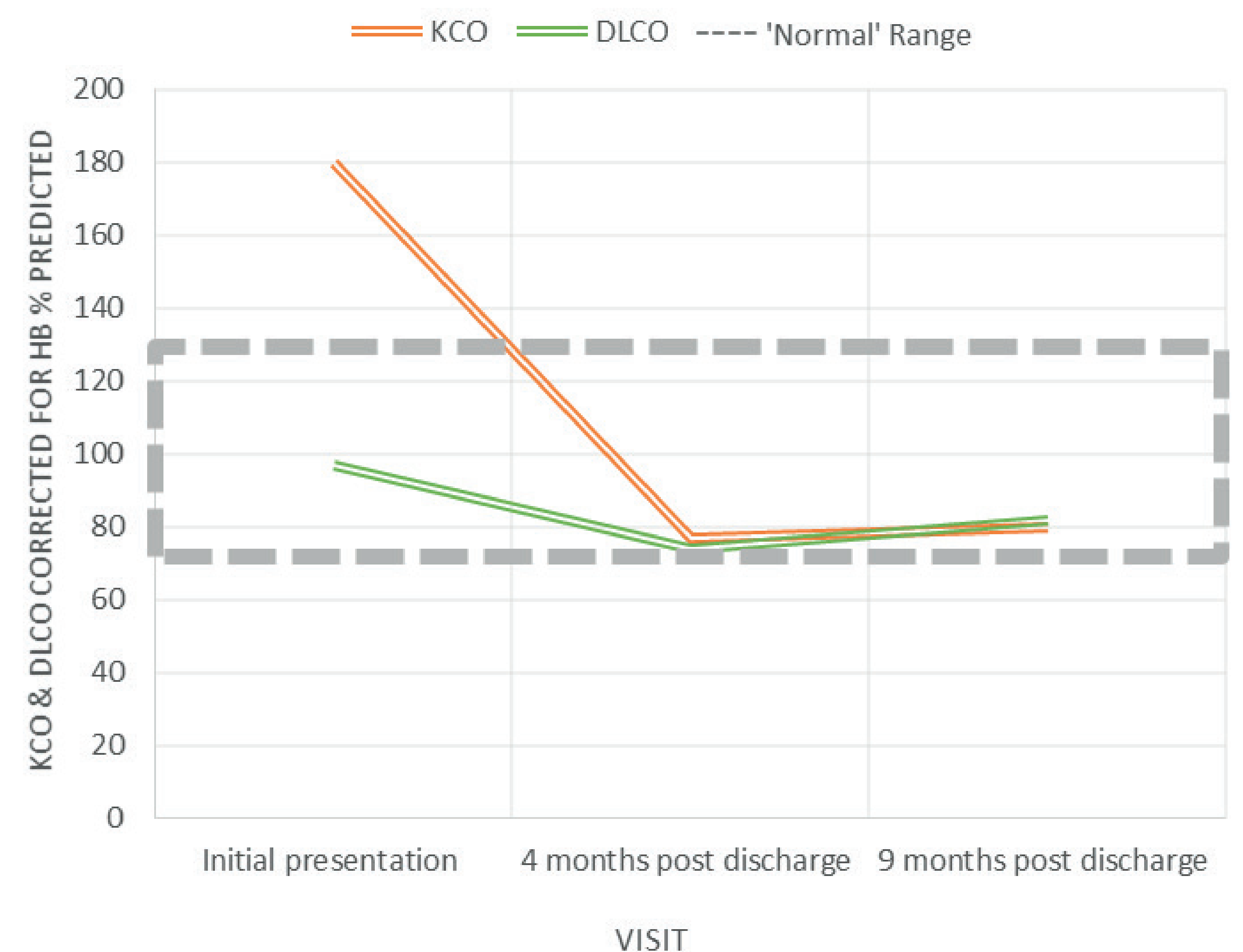
- Slow vital capacity and single breath gas diffusion using CO and Methane (CH<sub>4</sub>) were performed.
- Initial presentation, then intervals of 4 and 9 months post initial presentation.
- Testing conducted according to ATS/ERS standards<sup>3</sup>.
- Measurements corrected for Hb on each presentation, performed immediately prior to gas diffusion.

## Results



**Figure 1:** CT scan showing diffuse alveolar ground glass opacities with some patches of consolidation and peripheral sparing

## GAS DIFFUSION OVER TIME



## Summary

KCO, when corrected for anaemia can be elevated in the presence of pulmonary haemorrhage due to the extravascular blood in the lungs which increases capillary blood volume available to CO molecules, plus reduces the distance required for the binding of CO to Hb<sup>1,2</sup>.

## Conclusion

Quantifying gas diffusion, particularly KCO corrected for Hb, can be a clinically useful and sufficient measurement for detecting the presence of extrapulmonary blood in the alveoli and monitoring intrapulmonary haemorrhage over time<sup>1</sup>.

## References

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3. Graham B, Brusasco V, Burgos F, Cooper B, Jensen R, Kendrick A et al. 2017 ERS/ATS standards for single-breath carbon monoxide uptake in the lung. European Respiratory Journal. 2017;49(1):1600016.