

5 Diacon AH, Dawson R, von Groote-Bidlingmaier F, *et al.* 14-day bactericidal activity of PA-824, bedaquiline, pyrazinamide, and moxifloxacin combinations: a randomised trial. *Lancet* 2012; 380: 986–993.

6 Zumla A, Blasi F, Raviglione M. Rational use of anti-tuberculosis drugs in the EU: better patient care and less drug resistance. *Eur Respir J* 2012; 39: 802–804.

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Adjusting diffusing capacity of the lung for carbon monoxide for haemoglobin level

To the Editor:

The joint statements on lung function testing by the American Thoracic Society (ATS)/European Respiratory Society (ERS) Task Force provided useful recommendations for standardisation of the tests in daily practice [1]. However, the equations for adjusting diffusing capacity of the lung for carbon monoxide (DL_{CO}) for the haemoglobin (Hb) level (equations 13 and 14 in the original document) may be confusing [1]. In daily clinical practice, instead of changing the predicted reference value, we tend to adjust the observed DL_{CO} value as if the patient had a normal Hb level [2–4]. Therefore, as suggested by most guidelines [2, 4], we suggest new equations for adjustment, as shown in table 1.

It is well known that anaemia decreases observed DL_{CO} by decreasing the area for diffusion due to a reduction in pulmonary capillary haemoglobin [1–4]. For example, in our suggested equation for adult males and adolescents, a Hb level $<14.6 \text{ g}\cdot\text{dL}^{-1}$ makes $(10.22+\text{Hb})/(1.7 \times \text{Hb}) > 1$, making $DL_{CO_{\text{adjusted for Hb}}} > DL_{CO_{\text{observed}}}$ to eliminate the effect of anaemia. This adjustment makes DL_{CO} more standardised for assessing pulmonary conditions.

As the joints statements by the ATS/ERS Task Force are widely used as a guide for standardisation of clinical practice, we believe that clarifying this point is important.

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REFERENCES

- 1 Macintyre N, Crapo RO, Viegi G, *et al.* Standardisation of the single-breath determination of carbon monoxide uptake in the lung. *Eur Respir J* 2005; 26: 720–735.
- 2 American Thoracic Society. Single-breath carbon monoxide diffusing capacity (transfer factor). Recommendations for a standard technique – 1995 update. *Am J Respir Crit Care Med* 1995; 152: 2185–2198.
- 3 Marrades RM, Diaz O, Roca J, *et al.* Adjustment of DL_{CO} for hemoglobin concentration. *Am J Respir Crit Care Med* 1997; 155: 236–241.
- 4 American Association for Respiratory Care. AARC clinical practice guideline: single-breath carbon monoxide diffusing capacity, 1999 update. *Respir Care* 1999; 44: 539–546.

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TABLE 1 Summary of the suggested changes

Original equations (to adjust predicted value) [1]	Suggested equations (to adjust observed value)	Comments
$DL_{CO_{\text{predicted for Hb}}} = DL_{CO_{\text{predicted}}} \times (1.7 \times \text{Hb}) / (10.22 + \text{Hb})$	$DL_{CO_{\text{adjusted for Hb}}} = DL_{CO_{\text{observed}}} \times (10.22 + \text{Hb}) / (1.7 \times \text{Hb})$	For adult males and adolescents
$DL_{CO_{\text{predicted for Hb}}} = DL_{CO_{\text{predicted}}} \times (1.7 \times \text{Hb}) / (9.38 + \text{Hb})$	$DL_{CO_{\text{adjusted for Hb}}} = DL_{CO_{\text{observed}}} \times (9.38 + \text{Hb}) / (1.7 \times \text{Hb})$	For adult females and children <15 yrs of age

DL_{CO} : diffusing capacity of the lung for carbon monoxide; Hb: haemoglobin.