The oxygen contents of 64 blood samples were determined in duplicate by both methods. The values of [Hb], SO2, P02, and of the directly measured oxygen contents ranged from 9.2 to 13-3 g/dl, 30 to 99%, 22 to 126 mmHg and 4.5 to 17-4 vol.% respectively. There was a significant correlation between the two methods \( r = 0.99; P < 0.001 \) but the calculated method gave values for the oxygen content that were on average greater by 0.4 vol.% than those obtained by direct measurement.

Both the Lex-O2-Con and the oximeter require only 20 μl blood samples and the reproducibility of duplicate determinations of oxygen content with the former and [Hb] with the latter are critically dependent upon sample mixing. Measurements of [Hb] are independent of this factor. Sample analysis by the oximeter is quicker and easier to perform. If the [Hb] is determined from a separate sample that has been shaken aerobically, adequate sample mixing is ensured. When calculating the oxygen content it is not always necessary to determine the Po2 of the sample because the amount of dissolved oxygen can be estimated from the measured SO2 if the latter is less than 95%.

We conclude that the calculated method for determining blood oxygen content is quicker, less subject to operator error and gives results similar to those obtained by direct measurement.

108. EFFECT OF HYPOXIA AND HYPERCAPNIA ON LEFT AND RIGHT VENTRICULAR WEIGHTS AND ON PULMONARY VASCULAR HISTOLOGY IN THE RAT
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Short-term exposure to hypoxia produces reversible pulmonary vasoconstriction and hypertension; long-term exposure results in structural changes in the pulmonary vascular bed which limit reversibility. A current MRC trial is assessing the effect of prolonged limiting (or reversing) these structural changes in patients with hypoxic respiratory failure. These patients usually have concurrent hypercapnia and the administration of oxygen may cause arterial P02 to rise. It is not known whether P02 affects the genesis or resolution of structural changes caused by prolonged hypoxia. We have therefore studied the effect of hypoxia (7% CO2, 10% N2, balance N2) and combined hypoxia with hypercapnia (7% CO2, 12% O2, balance N2) on the weights of left (LV) and right (RV) ventricles and on the wall thickness of peripheral pulmonary vessels in rats; we have compared our results with controls and conducted a similar study in Jamaica. A simple health questionnaire provided data on smoking habits, and blood pressures were measured with the random-zero sphygmomanometer after examinees had been seated for 5 min.

A recent study of hospital admissions in Birmingham showed that West Indians had significantly fewer heart attacks than whites, whereas Asians had a similar frequency (Cruickshank et al., 1980). A low level of coronary heart disease in blacks has also been reported in London, Jamaica, and Evans County, Georgia. As part of an epidemiological screening project we have investigated blood pressure and other coronary risk factors in West Indians in Jamaica. As the results showed, all the participants were cigarette smokers and had high blood pressure.

109. PARTITIONING OF DIFFUSING CAPACITY (DLCO) IN LUNG HAEMORRHAGE
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A rise and fall in the carbon monoxide-diffusing capacity (DLCO) in Goodpasture's syndrome is associated with lung haemorrhage (Ewan et al., 1976, New England Journal of Medicine, 295, 1391–1396). Using Hamer's technique (Hamer, 1963, Clinical Science, 25, 385–398), we partitioned DLCO into its membrane \( (D_m) \) and reactive \( (V_r) \) components according to the equation \( D_{LCO} = D_m + 1/V_r \) (Roughton & Forster, 1957, Journal of Applied Physiology, 11, 290–302), where \( \theta \) is the ratio of replacement of oxygen by carbon monoxide in blood and \( V_r \), the pulmonary capillary volume. Duplicate measurements of DLCO with the single-breath technique were made at three different alveolar oxygen tensions corresponding to different values of \( \theta \). The correlation coefficient of 1/DLCO upon 1/\( \theta \) always exceeded 0.87. All measurements were made at full inspiration; \( \theta \) was corrected for the current haemoglobin level.

Ten normal subjects and four patients (three with Goodpasture's syndrome and one with Wegener's granulomatosis) were studied. The patients were studied between six and three times over periods of up to 25 days. In normal subjects mean values were: \( D_m \) (mmol min\(^{-1}\) kPa\(^{-1}\)): 25·4 (SD 6·5); \( V_r \) (ml), 9·5 (SD 1·8); \( D_{LCO} / V_r \), 0·27.

In three patients there was a clear rise and fall of \( V_r \), peak values ranging from 294 to 133 ml above baseline values of 106–80 ml. \( D_m \) did not change significantly (20 and 19·5). The \( D_{LCO} / V_r \) ratio changed from 0·103 to 0·196. In the fourth case, throughout, \( V_r \) remained abnormally high (174 ml) and \( D_m / V_r \) normal (25 mmol min\(^{-1}\) kPa\(^{-1}\)). Thus pulmonary haemorrhage was associated with values of \( V_r \) 188–33 ml in excess of baseline values. The significant fall in the \( D_{LCO} / V_r \) ratio and the normal \( D_m / V_r \) of interest because it is not seen in high cardiac output states.

The low \( D_m / V_r \) ratio will affect the correction of DLCO for haemoglobin concentration; if a ‘normal’ \( D_m / V_r \) ratio of 0·23 is assumed (Cotes et al., 1972, Clinical Science, 42, 325–335), considerable underestimation of ‘corrected’ DLCO may ensue.

110. BLOOD PRESSURE AND SMOKING HABITS IN WEST INDIANS IN JAMAICA AND IN BIRMINGHAM IN COMPARISON WITH WHITES AND ASIANS
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A recent study of hospital admissions in Birmingham showed that West Indians had significantly fewer heart attacks than whites, whereas Asians had a similar frequency (Cruickshank et al., 1980). A low level of coronary heart disease in blacks has also been reported in London, Jamaica, and Evans County, Georgia. As part of an epidemiological screening project we have investigated blood pressure and other coronary risk factors among black, white and Asian males in factories in Birmingham and conducted a similar study in Jamaica. A simple health questionnaire provided data on smoking habits, and blood pressures were measured with the random-zero sphygmomanometer after examinees had been seated for 5 min.

All groups showed a rise in blood pressure with increasing age. In 40-49 year old men the systolic blood pressures were 138 ± 20·9 mmHg for whites, 137·9 ± 15·6 for Asians, 141·1 ± 29·5 for Birmingham West Indians and 131·2 ± 23·9 for Jamaicans, whose mean weights were 8·9% for whites and 7·6% for Asians and 8·0% for blacks. Fifty-four per cent of whites and of blacks in Birmingham and in Jamaica were cigarette smokers, compared with 44% of Asians.

We conclude that these ethnic differences in blood pressure and cigarette smoking cannot explain the large differences in coronary heart disease found in blacks, whites and Asians.