Correspondence

Repeatability of ventilatory function measurements in a population survey of seven year old children

SIR,—The impression was given by Dr David Strachan (June 1989;44:474-9) that the coefficient of variation for FEV₁ in seven year old children was low, possibly even lower than that for the vital capacity. We wonder whether this could be a spurious finding. In a recent survey of 120 healthy seven year old school children, we found that 29.2% exhaled their full vital capacity within one second and that forced vital capacity (FVC) and FEV₁ were identical. Dr Strachan does not report a similar figure for his own group. We would suggest that the FEV_{0.5} or FEV_{0.75} are more useful indices of lung function than FEV₁ in seven year old children.

Dr Strachan's conclusion that the peak expiratory flow (PEF) was less suitable than FEV₁ for repeated measurements during airway challenge in young children is again based on data which are potentially spurious. The criteria by which Dr Strachan himself chose to accept or reject the forced expiratory manoeuvre in his study subjects was the reproducibility of the FVC and FEV₁. Not surprisingly, these were the two most reproducible indices. It is well known that PEF obtained by pneumotachograph may be different from that obtained by Wright peak flow meter.¹ The two have very different within subject variability.

Unfortunately, Dr Strachan's conclusion was not based on an examination of the reproducibility of the PEF by Wright peak flow meter, routinely used for PEF measurements in airway challenge. Our findings, based on 120 healthy seven year old school children, do not support Dr Strachan's conclusion (table). We suggest that, because of the differences in forced expiratory technique needed, PEF and FEV₁ (or FEV_{0.75}) should be separately determined in young children.

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- 1 Polgar G, Promadhat V. *Pulmonary function testing in children: techniques and standards*. Philadelphia: Saunders, 1971.
- 2 Chinn DJ, Cotes JE. Transmit time analysis of spiograms: which blow is best? *Bull Eur Physiotherol Respir* 1986;22:461-6.

Coefficients of variation for different lung function indices

Lung function index	Coefficient of variation
FEV ₁ *	3.1
Forced vital capacity*	3.6
Peak expiratory flow:	
Pneumotachograph*	14.6
Wright peak flow meter†	5.0

*Based on three pneumotachograph recordings selected in accordance with the recommendations of Chinn and Cotes,² provided that the FVC values were within 5% of the maximum value.

†Based on four Wright peak flow recordings.

AUTHOR'S REPLY The pneumotachograph used in my study did not record any spirometric indices if the expiration lasted less than one second. Ninety nine per cent of the 892 children in the main survey were persuaded to complete baseline spirometric tests. Nevertheless, among the 635 recordings in the repeatability study, only 10 (1.6%) had equal values for FEV₁ and forced vital capacity (FVC). The FEV₁/FVC ratio was 99% or greater in 29 (4.4%) and 95% or greater in 126 (19.8%). The ratios FEV_{0.5}/FVC and FEV₁/FVC were highly correlated ($r = +0.89$) and had similar between subject variability (SD 10% for FEV_{0.5}/FVC, 9% for FEV₁/FVC). In unpublished analyses of ventilatory function by medical history, socioeconomic status, housing characteristics, and salivary cotinine concentration, FEV₁ was generally more strongly related than FEV_{0.5}, although both varied in a similar direction.

I agree that peak flow and forced expiratory manoeuvres are different, and referred in the discussion to possible difficulties in extrapolating my findings to PEF recordings from a Wright meter. As I stated, however, the PEF used in the analysis was the maximum achieved, so it was independent of the choice of best curve based on reproducibility of FEV₁ and FVC. This may explain why the coefficient of variation (CV) for PEF in my study (7.0%) is substantially lower than the 14.6% quoted by Drs Chan and Silverman, and more comparable with the CV they obtained with the Wright peak flow meter. Indeed, the ratio of CV for PEF(max,Wright) to CV for FEV₁ in their sample (5.0/3.1 = 1.61) is almost identical to that for PEF(max,pneumotachograph) to FEV₁ in mine (7.0/4.3 = 1.63). The generally lower variability in their study is encouraging, but theirs was a healthy population, whereas my sample included wheezy children.

If a CV as low as 5% can be achieved with Wright meters, then bronchial challenge tests using PEF¹ would avoid excessive false positive rates. Both studies, however, suggest that FEV₁ is a substantially more repeatable index at this age.

DAVID STRACHAN

- 1 Tsanakis JN, Milner RDG, Bannister OM, Boon AW. Free running asthma screening test. *Arch Dis Child* 1988;63:261-5.

Relapse of pneumocystis pneumonia in the upper lobes during aerosol pentamidine prophylaxis

SIR,—Dr R M Bradburne and others (July 1989;44:591-3) report the relapse of *Pneumocystis carinii* pneumonia in the upper lobes during prophylaxis with pentamidine 60 mg administered every two weeks with a Respigard II nebuliser. The authors suggest that this may be due to increased clearance of pentamidine. There is no evidence to support this hypothesis for, although DTPA transfer is increased in patients with pneumocystis pneumonia, pentamidine is retained in lung tissue for prolonged periods, and concentrations in plasma are very low after aerosol treatment.¹ The combination of dose of pentamidine and nebuliser system used may explain the upper lobe recurrence of pneumocystis pneumonia in their patient. Using technetium-99m labelled human serum albumin as a marker for pentamidine deposition, we have shown that when the Respigard II