

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.

N CHAN

M SILVERMAN

Department of Paediatrics and Neonatal Medicine
Royal Postgraduate Medical School
London W12 0NN

- 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 Respirgard 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 Respirgard II

nebuliser is used to administer 50 mg pentamidine in a 3 ml solution total pulmonary deposition is only 1.5 mg (SHL Thomas *et al*, Vth International Conference on AIDS, Montreal, 1989), and only 0.18 mg is deposited in the upper third of the right lung (M O'Doherty *et al*, *ibid*). Upper zone deposition is increased by inhaling the aerosol in the supine position (M O'Doherty *et al*), and this may reduce recurrence of disease in this region. That the dose of pentamidine used in this patient may have been too low is indicated by the results of Leoung *et al* (Vth International Conference on AIDS). In their large study of aerosolised pentamidine prophylaxis the authors found no recurrence of disease in the upper lung with doses of 150 mg every two weeks or 300 mg every month, using the same nebuliser. We suggest that if the Respigard II nebuliser is to be used these higher doses of pentamidine are required; this is in line with the recommendations of the United States Food and Drugs Administration.

Further benefit may be obtained by supine inhalation of aerosol, or the use of nebulisers which give greater pulmonary drug deposition² (see also SHL Thomas *et al*, Vth International Conference on AIDS).

MJ O'DOHERTY

SHL THOMAS

NT BATEMAN

*St Thomas's Hospital
London SE1 7EH*

- 1 Conte JE, Golden JA. Concentrations of aerosolised pentamidine in bronchoalveolar lavage, systemic absorption, and excretion. *Antimicrob Agents Chemother* 1988;32:1490-3.
- 2 O'Doherty MJ, Thomas S, Page C, *et al*. Differences in relative efficiency of nebulisers for pentamidine administration. *Lancet* 1988;ii:1283-6.

AUTHORS' REPLY We appreciate the comments of Dr O'Doherty and his colleagues and agree that recent work has helped to elucidate potential deficiencies of current nebuliser systems and dosage for pentamidine prophylaxis of *Pneumocystis carinii* pneumonia in HIV infected patients. We would point out, however, that at the time our patient was treated updated guidelines for aerosolised pentamidine prophylaxis were not published¹ and the treatment we gave was that which was accepted at the time. We would also like to reiterate that the main purpose of our report was to document the occurrence of pneumocystis pneumonia limited to the upper lobes (made possible by availability of serendipitous serial gallium scans at a time when the chest radiograph was negative), and to point out another potentially remediable cause of pentamidine prophylaxis failure—namely, interruption of treatment due to intercurrent illness.

Although preliminary reports of the effectiveness of increased doses of pentamidine¹ and supine positioning² are encouraging, conclusions regarding their efficacy in clinical practice await results from widespread usage. Clinicians caring for HIV infected patients should continue to be vigilant for atypical presentations of pneumocystis pneumonia. To this end, gallium scanning may be useful, as it was in our case. Moreover, patients should be encouraged to receive pentamidine prophylaxis despite intercurrent illness.

R MARK BRADBURNE
DAVID B ETTENSOHN
STEPHEN M OPAL
F DENNIS MCCOOL

- 1 Anonymous. Guidelines for prophylaxis against *Pneumocystis carinii* pneumonia for persons infected with human immunodeficiency virus. *Mortality and Morbidity Weekly Reports* 1989; 38(s-5):4-50.
- 2 O'Doherty MJ, Thomas S, Page C, *et al*. Differences in relative efficiency of nebulisers for pentamidine administration. *Lancet* 1988;ii:1283-6.

Notices

Scadding-Morrison Davies joint fellowship in respiratory medicine 1990

This fellowship is available to support visits to medical centres in the United Kingdom or abroad for the purpose of undertaking studies related to respiratory medicine. Medical graduates practising in the United Kingdom, including consultants and irrespective of the number of years in that grade, may apply. Applicants should submit a curriculum vitae and a detailed account of the duration and nature of the work and the centres to be visited, confirming that these have agreed to provide the facilities required and giving the sum of money needed for travel and subsistence. Up to £12 000 may be awarded to a successful applicant, or the sum may be divided to support two or more applicants. Applications should be sent by 31 January 1990 to the Secretary to the Scadding-Morrison Davies Fellowship, Dr I A Campbell, Llandough Hospital, Penarth, Cardiff CF6 1XX.

Respiratory physiology applied to medicine

A three day course on respiratory physiology applied to medicine, organised by Drs J M B Hughes and N B Pride, will be held at the Postgraduate Medical School on 5-7 March. It will comprise lectures and case discussions on the physiological background, methods, and application of the common and not so common pulmonary function tests, aimed at doctors and technicians who work in pulmonary function laboratories or who engage in physiological research. Application forms and further details from the Wolfson Conference Centre, Royal Postgraduate Medical School, Hammersmith Hospital, London W12 0NN (01-740 3117).