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<th>Inhaled corticosteroids in COPD: Letters to the editor</th>
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Inhaled corticosteroids in COPD

The importance of presenting absolute cell numbers when counting cells in biological samples is illustrated by the potentially misleading interpretation of data in the paper by Marco Confalonieri and colleagues. The authors concluded that, in addition to reduced sputum neutrophils, the in vitro sputum macrophages increased significantly following treatment with inhaled beclomethasone dipropionate in patients with COPD. However, the observed increase in the proportion of sputum macrophages from 19.6% before treatment to 35.8% following treatment is entirely attributable to the increased number of sputum neutrophils. From the data presented in the paper, the absolute numbers of different cells in the sputum can be calculated (table 1), revealing that the absolute sputum macrophage count was essentially unchanged following treatment. It is important that the absolute numbers of cells, and not simply their proportions, are presented when measuring differential cell counts in sputum samples in any other biological sample.

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AUTHORS' REPLY

We would like to thank Dr Tsang for his interesting comment. We appreciate his finding of a lack of effect of inhaled corticosteroids both on cells and inflammatory mediators in a group of patients with bronchiectasis without any parallel changes in S_{O2} or lung function indices. We agree with Dr Tsang on the necessity of long term trials with a sufficient number of subjects to show any beneficial effect of inhaled corticosteroids on inflammatory airways other than asthma. In fact, as mentioned in our paper, Stanescu et al. showed that airway obstruction as well as accelerated decline in lung function are associated with increased numbers of neutrophils in the sputum. This suggests that a reduction in airway inflammation (neutrophils) might influence the decline in lung function only over a long period of time. Further research on the effect of corticosteroids on airway inflammation could also clarify the similarities and differences in distinct airways diseases with fixed obstruction.

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4 Stanescu D, Sanna A, Neerle V, et al. Airway obstruction, chronic bronchitis, and rapid decline of FEV1 in smokers are associated with increased levels of sputum neutrophils. Thorax 1996;51:267-71.

We read with interest the effect of inhaled corticosteroids in reducing the neutrophil count in patients with chronic obstructive pulmonary disease (COPD). This highlights the value of sputum induction as a tool in the study of airway inflammation in a diverse range of airway diseases. The authors have concentrated on the effect of beclomethasone dipropionate on neutrophilic inflammation, but we note that in both the control and treatment groups the mean sputum eosinophil count was outside the normal range of our laboratory and others (sputum eosinophils 0-2%). The authors did not comment on whether this eosinophilia was significantly different from the normal subjects they studied. Do they have any explanation for this apparently high sputum eosinophil count? Did any of the subjects have a previous history of asthma?

We have recently described a population of patients with fixed airway obstruction and a marked sputum eosinophilia, and there is some evidence that such patients respond poorly to inhaled corticosteroids. Although there was no overall change in the sputum eosinophil count, we wonder whether some of the patients in the treatment group and their co-workers fit into this category and whether the effect of beclomethasone dipropionate was different in these patients.

Until we clearly establish whether sputum evidence of an eosinophilic bronchitis predicts a response to corticosteroids and determine how common it is in patients with COPD,
interpretation of trials of corticosteroid therapy in COPD will remain difficult.

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3 Chinn D, Capella AM, O'Shaugnessy T, et al. Corticosteroid reversibility in COPD is related to features of asthma. Am J Respir Crit Care Med 1997;155:1259-64.

**AUTHORS' REPLY** We would like to thank Drs Brightling and Pavord for their interesting comments. As stated in our article, we enrolled only patients with severe COPD, diagnosed according to a recent European Consensus. However, some of them had a previous history of asthma. The percentage of sputum eosinophils in the global COPD study population (34 subjects; mean [SE] 50.7%) was not significantly different from that of the healthy subjects (16 subjects; mean [SE] 48.2%) by the Mann-Whitney U test (p = 0.08). Indeed, if we consider the untreated and control groups separately, a significant increase in the proportion of sputum eosinophils is seen in both COPD groups compared with the healthy subjects.

We suggest that the sputum eosinophilia in our patients with smoking related COPD could be explained by their current smoking habit. In fact, a recent experimental and clinical data seem to support the hypothesis that exposure to cigarette smoke can induce eosinophilic airway inflammation both in animals and humans.

Although there was no overall change in the sputum eosinophil count after two months of treatment with beclomethasone dipropionate, we have analyzed separately the seven subjects with eosinophil >2% in the treated group. In these subjects, not only neutrophils but also sputum eosinophils decreased (from [SD] 4.5 [3.9] to 2.0 [0.4]) after two months of treatment, although the difference did not reach statistical significance (p = 0.06). Moreover, these subjects did not show a significant increase in FEV1 after two months of treatment with inhaled corticosteroids (from 60.1 [5.6%] to 64.9 [4.1%] predicted).

We also analyzed separately the subgroup of treated patients with COPD with sputum eosinophils <2% in order to verify the changes in sputum neutrophils after two months of treatment with inhaled beclomethasone dipropionate. The patients showed a significant reduction in both total cell and neutrophil counts after treatment. In fact, the mean difference from baseline of the total cell count (cells/L) was 191 (31.8) (95% CI 68.5 to 314), and the mean difference from baseline of the neutrophils was 27 (1.7) (95% CI 22.9 to 31.1).

We are grateful to the authors of this letter for their careful consideration that provides a good insight into our paper. Nevertheless, the results of our study do not change since a reduction in sputum neutrophils was observed after treatment with high dose inhaled beclomethasone dipropionate in the subgroup of patients with COPD without sputum eosinophilia.

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**Coal mining and COPD**

Professors Coggon and Newman Taylor correctly state that it is my opinion that the adverse effects of cigarette smoking vary markedly with only around 15-20% of smokers being affected, while the effects of coal mine dust are much more evenly distributed. They find my arguments unconvincing because Fletcher and coworkers' "seemingly longitudinal study into the natural history of COPD" demonstrates that the presence of chronic bronchitis has had no independent influence on the decline of the FEV1.

I yield to none in my admiration for the work of Fletcher and his coworkers, but it needs to be pointed out that the men selected were "aged 30 to 50 years since younger men were thought unlikely to have developed airways obstruction by this age." In this connection their assumption was incorrect. While non-smoking men aged 23-35 show either an extended plateau or a period of slow continued growth, at about the age of 35 they start to lose FEV1 due to ageing. In contrast, male smokers show a plateau or a minimal increase between the ages of 23 and 30 but a decline in the FEV1 at the start of the third decade, with the rate being slightly greater than that for non-smokers over the age of 35. In addition, the increase in the FEV1 between the ages of 20 and 30 in smokers is substantially less than that noted in non-smokers: 'The second or rapid progressive decline in the FEV1 of smokers occurs later, around the age of 40 to 50 years. The early decline in young persons appears completely reversible and cannot be attributed to emphysema. Moreover, it is known that many young smokers have what is termed "smoker's cough" with the production of sputum. In this connection Coggon and Newman Taylor quote two papers, both of which claim to show the early onset of a reduction in the FEV1 in coal miners—that is, to say, in the first 10 years.' None of these early changes would have been apparent in the studies of Fletcher and colleagues.

Clearly, something must be done to explain the early decline in the FEV1 that occurs in the 20-30 age group, be they non-smokers who smoke or miners exposed to other dusts such as asbestos or coal, or both. Emphysema cannot account for this reduction and some other mechanism must be sought. It will not do to torture the data until they confess so that some other statistical explanation becomes apparent. Perhaps Coggon and Newman Taylor would also explain why older smokers with established chronic airflow limitation show a mean improvement of around 50 ml in the FEV1 after they stop smoking. Presumably the emphysema does not improve but we know that their smoker's cough and spumus usually do—that is, their bronchitis disappears.

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**AUTHORS' REPLY** We remain unconvinced that bronchitis can explain other than at most a small part of the loss of FEV1 associated with exposure to coal mine dust. To include smoking as a major influence on airflow, we would have expected it to be apparent in Fletcher's study. Professor Morgan refers to an early decline in FEV1 in young smokers that is reversible and therefore cannot be attributable to emphysema, and also to a mean improvement in FEV1 of 50 ml among older smokers with established chronic airflow obstruction who stopped smoking. However, he does not indicate that these effects are restricted to, or even more prominent in, subjects with symptoms of bronchitis. Moreover, the improvement of 50 ml is small in comparison with the deficits of FEV1 associated with coal mine dust, which average more than 250 ml in miners with heavy cumulative exposure. These deficits persist after cessation of exposure and are of similar magnitude in miners with and without symptoms of bronchitis.

For these reasons and the others set out in our review, we stand by our conclusion that there is strong evidence that coal mine dust can have a critical influence on health in an important number of people.

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