Recommended standard theophylline doses are inadequate in chronic obstructive pulmonary disease

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Summary
Theophylline serum levels were measured in 34 adult patients suffering from chronic obstructive pulmonary disease. It was not possible to establish a simple relationship between the dose of theophylline and the serum levels measured. Only 53% of peak concentrations and 40% of trough concentrations were found to be within the recommended therapeutic range. In 82% of patients studied, two or more drugs in addition to theophylline, were required for adequate bronchodilatation. For optimisation of theophylline therapy, the importance of measuring serum theophylline levels is stressed.

Results
Of the 34 patients studied 32 were suffering from COPD, 9 of whom had some reversible component. Two patients were pure asthmatics. Three of the 34 patients were cigarette smokers. The average age of the group was 62.5 years (± 10.4 years) (range 35-84 years). A total of 89 serum levels of theophylline were measured. Three or more levels were measured in 14 patients, 2 levels in 6 patients, and 1 level was measured in 14 patients. Of the 64 peak serum concentrations measured, 34 (53%) fell within the therapeutic range, while of the 25 trough levels measured 10 (40%) fell within the therapeutic range of 10 - 20 μg/ml (Figs 1 and 2).

Discussion
The relationship between the dose of theophylline and the resulting serum concentration is known to be exceedingly variable, primarily due to the interindividual variations in the
was found that 82% of patients were receiving two or more bronchodilator drugs in addition to theophylline in order to achieve adequate bronchodilation. While the effectiveness of multiple drug therapy in this study is acknowledged, its cost-effectiveness is questioned.

This study emphasises the need to optimise theophylline therapy by means of individualised mg/kg dosage calculations and the use of serum level measurements.

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