LETTER

Gender differences in COPD: are women more susceptible to smoking effects than men?

We read the paper by Sørheim et al. with interest since possible clinical bias with regard to sex and disease in terms of diagnosis and treatment is clearly an important issue. The main problem with comparing the effect of a disease such as chronic obstructive pulmonary disease (COPD) between the two sexes is how one expresses the lung function deficit so that the data for the two sexes can be correctly analysed together.

We believe the method used by Sørheim et al. introduces a sex bias that may be incorrectly influencing their result. The authors used percentage predicted to express the degree of abnormality and, depending on the equations used, this may bias the result with regard to sex and age. Using the equations used by Sørheim et al.,3 the scatter about the predicted value is the same for both sexes although the absolute predicted values for men are higher. This means that a man and a woman with forced expiratory volume in 1 s (FEV1) values at equivalent deviation from predicted in population terms—for example, 1.645 standard deviations below predicted (equivalent to the 5th centile)—will have quite different percentage predicted values. Thus, for men of 1.80 m and women of 1.65 m (average height of the authors’ prediction equations4) at the age of 25 years, the FEV1 values at the 5th centile are 86.3% and 83.7% of predicted, respectively, and at the age of 70 they are 81.7% and 76.7% of predicted, respectively. In the paper by Sørheim et al. the mean height of their subjects is not given but, assuming the above values and using the mean ages of the groups in table 1 in the paper, the 5th centile FEV1 values would be at 82.5% and 75.6% predicted for the men and women, respectively, with COPD and 84.2% and 80.9% predicted for those without COPD. This demonstrates how percentage predicted falsely suggests that subjects with equivalently low FEV1 values in population terms appear to be different, with a bias towards women having apparently worse values than men. This bias is greater in older subjects and those with worse lung function. When using the ECCS prediction equations, this effect is still present but is much less than that seen with the equations used by Sørheim et al. Thus, using percentage predicted with the authors’ prediction equations automatically makes low results for women appear worse than equivalently low results for men. We do not believe the paper by Sørheim et al. has proved that women are more susceptible to smoking effects and their conclusion could well be an artefact based on the incorrect method used for expressing lung function abnormality. We suggest that the authors should rework their data with statistically valid methodology with their equations, such as using standardised residuals5 or centile values, and perhaps verify this with the generic equations of Stanojevic et al.6 in order to determine if women are truly more susceptible than men to the effects of smoking.

REFERENCES
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