

CORRESPONDENCE

Disentangling the discordance between epidemiological associations and physiological mechanisms

Burney *et al*¹ recently presented an ecological analysis of Burden of Obstructive Lung Disease (BOLD) study data to investigate the association between chronic obstructive pulmonary disease (COPD) prevalence and mortality with smoking and poverty. It is striking that no association was observed between the national prevalence rates of COPD and airflow limitation. This raises serious questions about the accuracy of COPD diagnosis, and suggests that COPD was considerably overdiagnosed. Despite this, the authors' main conclusion is that the high COPD mortality in low-income countries is associated with spirometric restriction, but the case for this is unconvincing.

There are several methodological reasons why the findings need to be considered cautiously. First, each of the data sources (national mortality data, World Bank gross national income, Tobacco Atlas) has its own documented limitations, which are further compounded when combined. Comparisons of national statistics data to random samples collected as part of the BOLD study are ecologically biased (*failure of expected ecological effect estimates to reflect the biological effect at the individual level*), and can provide misleading evidence if not critically evaluated.

The authors also report an alarmingly high prevalence of spirometric restriction in some countries, specifically 67.7% and 70.5% in men and women in India respectively. At an ecological level, spirometric restriction (FVC < lower limit of normal (LLN)) was found to be associated with higher COPD mortality and lower gross national income. Ethnic differences in lung function, whether physiological or pathological, are most certainly an alternative explanation for the observed patterns of apparent spirometric restriction in low-income countries if defined as FVC < LLN, where the LLN is derived from white subjects. It is surprising that in a study designed to compare ethnically heterogeneous sites from across the world, Burney *et al* mention ethnicity only towards the end of the Discussion. The authors ignore the possibility that in some populations, differences in body frame and hence, lung size relative to standing height, may be smaller than in white Europeans. If ethnic differences in lung volumes even partially explain the differences observed between countries, then the associations observed by Burney *et al* are grossly overestimated (figure 1).

While there is an urgent need for good quality evidence to demonstrate that COPD is an important public health issue in low-income countries, it is equally important not to overstate the problem, so that the limited available resources can be allocated in the most effective manner.

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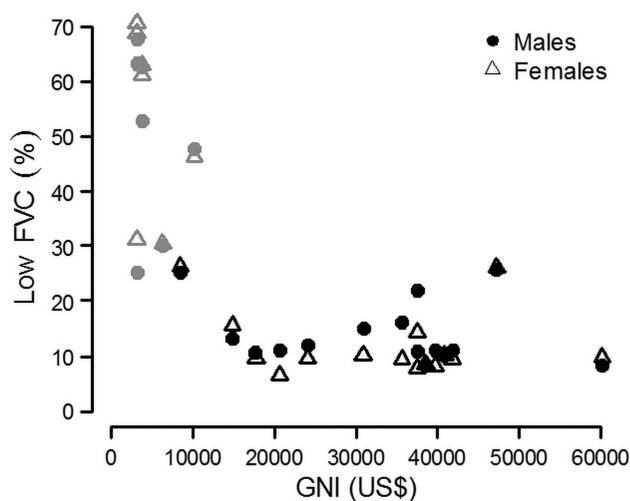


Figure 1 To illustrate that ethnicity may be a confounding factor in the association between spirometric restriction and Gross National Index (GNI) (US\$), figure 3B was redrawn using data from table 1 from Burney *et al*, distinguishing sites with predominantly European ancestry (black) from those of other ethnic groups (from China, India, The Philippines and South Africa) (grey).

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REFERENCE

- 1 Burney P, Jithoo A, Kato B, *et al*; for the Burden of Obstructive Lung Disease S. Chronic obstructive pulmonary disease mortality and prevalence: the associations with smoking and poverty—a BOLD analysis. *Thorax* 2014;**69**:465–73.