Biomass fuel makes lungs a decade older – time to take action

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In many developing countries, biomass fuel combustion contributes to high levels of toxic indoor air pollution claiming a large burden of diseases (Ezzati et al. 2002). Smith and Mehta (2003) attribute at least 4% to 5% of death and disability adjusted life years to this preventable exposure. In this issue, Sümer et al. (2004) confirm the adverse effects of biomass combustion on lung capacities and flows among adults in a rural area of Turkey. This cross-sectional comparison has inherent limitations as acknowledged by the authors. In essence, the study compares pulmonary function between rural and urban populations. These populations may differ in more than in the measured covariates. It is difficult to predict how the non-measured determinants of pulmonary function would affect the comparison. Uncontrolled factors such as passive smoking, traffic-related ambient air pollution, diet, atopy, or genetic susceptibilities may be associated with the community, with some factors leading to overestimation and others to underestimation of the true contribution of biomass use on pulmonary function. Thus, the observed difference may be considered a crude estimate of the independent effect of biomass combustion on lung function.

Despite these limitations, the study has far reaching relevance to public health (Pandey et al. 1989; Ezzati & Kammen 2002; Ezzati & Kammen 2002; Bruce et al. 2000). The observed difference in key measures of lung function is large, e.g., some 10% to 15% lower capacity (FEV1) among women using biomass fuel. Such a shift in population mean vital capacity greatly increases the number of subjects with clinically relevant reductions in pulmonary function (Künzli et al. 2000). The health effects of biomass use are much larger than those of parental smoking on adult lung function (Svanes et al. 2004). In fact, the effect observed in these non-smoking women is at least the size attributed to long-term smoking (Upton et al. 2004). Reduced lung function is an important measure of general health and associates with higher rates of respiratory as well cardiovascular morbidity (Schroeder et al. 2003). Based on the ARIC study, the observed ~ 400 ml lower FEV1 in non-smoking women translates into some 50% to 100% higher hazard rates for incident coronary heart disease (Schroeder et al. 2003). Diseases of low pulmonary function lead to reduced quality of life and increased health care costs, and, ultimately, lower lung function and is strongly correlated with shorter life expectancy (Hole et al. 1996; Ashley et al. 1975). Thus, one expects the rural population in Anatolia to suffer higher levels of morbidity and mortality as a consequence of the use of biomass fuel. Table 2 (Sümer et al. 2004) suggests the effects of using biomass fuel to be of a similar size as a 10 year difference in age.

This paper clearly highlights the need to remove this preventable health hazard, and the availability of local studies (Sümer et al. 2004; Cetinkaya et al. 2000) should be a major incentive for regional and national authorities, policy makers, and health professionals to make a change. It will be a challenge to turn low-tech rural communities into societies that adopt sustainable energy systems. To be successful, strategies need to be responsive to cultural values, local traditions, and other public health and daily life priorities among economically underprivileged people. Furthermore, from a global perspective, alternatives to biomass combustion should not lead to increases in greenhouse gas emissions. Thus, one has to seek for synergisms between efforts to reduce green house gases and those to reduce health-damaging emissions from biomass combustion (Smith 2002). Energy systems that rely on fossil or nuclear fuel burning are certainly not an alternative (McCally 2002), thus, interdisciplinary collaboration is needed among public and environmental health professionals and experts in renewable energies to find locally appealing solutions.

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Paradoxically, cow dung is a locally produced, sustainable renewable source of energy that comes, however, with a high price on public health. Other locally produced energies might provide alternatives for Anatolia's energy future. Fortunately, Turkey – a southern country with large areas of dry and very sunny climates – has another ubiquitous source of renewable energy: the sun. It shall contribute to a decentralized, healthy, and sustainable local energy production.

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