

## Gas cooking and respiratory disease

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More than half of British homes use gas as their cooking fuel and even a small risk associated with either acute or chronic inhalation of the by-products of gas combustion—such as other nitrogen containing species, formaldehyde, sulphur dioxide and particulates—would have a substantial influence on public health. Surveys have been performed to assess these risks, variably defining exposure by the presence of a gas cooker in the home or by direct measures of related pollutants. Results from these surveys are remarkable by their lack of consistency. While some large and powerful cross sectional studies have found no association of the presence of a gas cooker<sup>1 2</sup> or level of indoor nitrogen dioxide<sup>3</sup> with respiratory disease in children, others report an increased risk of lower respiratory illness.<sup>4-6</sup> Those who use the cooker the most—arguably adult women—may be the group at greatest risk. The European Community Respiratory Health Survey (ECRHS) which analysed data collected from young adults aged 20–44 years living in 23 centres in 11 countries showed no association of gas cooking with wheeze in men but an overall positive association in women.<sup>7</sup> However, there was marked heterogeneity in the association in women across the centres despite the common methodology used to define exposure and outcome, with the strongest positive association being observed in women in East Anglia.

There are few data on the association of gas cooking with symptoms and lung function in the elderly, although a study in Krakow<sup>8</sup> where gas is almost universally used as the cooking fuel showed that women over the age of 65 years who reported heavy usage of their cooker had more symptoms and worse lung function than those using it less frequently. In this issue of *Thorax* Dow *et al* publish findings from a cross sectional postal survey of elderly adults living in Bristol.<sup>9</sup> They found no overall increase in the prevalence of respiratory symptoms in those owning a gas oven, gas hob or gas fire, but their results showed that the risk of respiratory symptoms was consistently higher in women with a gas hob than in those without. The association was less apparent in men. They conclude that gas cooking is unlikely to be an important source of morbidity in the elderly population. The atopic status of those who took part in the study is unknown. Although the prevalence of atopy is lower in older populations than younger populations, this omission may be of importance because there is some research to suggest that the effect of exposure to gas may be different in those who are atopic and non-atopic. In the analysis of data collected in East Anglia as part of the ECRHS<sup>10</sup> atopic women had more symptoms and worse lung function if they cooked with gas rather than electricity. This observation is consistent with small clinical trials suggesting that inhalation of high levels of nitrogen dioxide, as might be experienced around a gas cooker at the time of use, enhance bronchial responsiveness to inhaled allergen<sup>11</sup> and enhance the allergen induced late phase asthmatic reaction.<sup>12</sup>

Another recent study collected information on reported exposure to gas cooking in childhood and currently in 35 year old subjects from the 1958 national birth cohort<sup>13</sup> and assessed atopy (by skin tests) and lung function. Overall there was no association between the incidence or severity of asthma and use of gas for cooking, although in women

current gas cooking was associated with a significantly increased risk of persistence of asthma from childhood to adulthood. Men and those with established asthma had lower forced expiratory volume in one second and forced vital capacity if they cooked with gas than with electricity. None of the analyses performed showed effect modification by atopy.

Although these recent studies offer some reassurance to the general public, some doubt remains as to whether there are subgroups of individuals—such as those with atopy, asthma, or poor lung function—who are more susceptible than others. Until this is resolved everyone should be advised to take sensible precautions to reduce their exposure to gas fumes. These precautions include regular servicing of gas appliances to ensure they are working safely and efficiently and adequate ventilation of the kitchen when the cooker is on by either opening a door or window to the outside or by use of an appropriate extractor fan. The gas rings should never be used to heat the kitchen. Meanwhile the potential interaction between pollutants from gas cookers and allergen, both acutely and long term, warrants further investigation. Large longitudinal studies that assess changes in symptoms and decline in lung function in populations of known atopic status and which also measure exposure to gas cooking and allergen are required. This will help to determine whether the resources currently invested in reduction of exposure to house dust mite should be supplemented or replaced by a change from gas to electric cooking in some homes.

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