Summary

There are three main findings from the study.

i. During the survey period, the average number of respiratory patients due to particulate air pollution in Armidale was 8.80 persons/day.

ii. Approximately 38% of the total respiratory visits to local GP clinics were due to particulate air pollution.

iii. Taking into consideration the costs and expenses arising from such ailments, the average daily economic cost of respiratory symptoms due to particulate air pollution was estimated to be $1666.

The estimated economic cost is conservative, and it only considers the direct medical costs. Dollar outlays were calculated in terms of GPs' usual charge for surgery visits, cost of drugs, and time loss estimated on the basis of the average wage rate. Related costs, such as X-rays, hospital admission, emergency room visits, alternative medicines and so on, and costs associated with 'pain and suffering', and mortality have been ignored. Conceptually, the monetary aspect could be extended further. One important step would be to estimate the value of missed schooling and work loss. Contingent valuation techniques (Karimzadegan et al. 2007) might yield estimates of willingness to pay by the people of Armidale for the value of 'pain and suffering' due to respiratory symptoms.

The study did not take account of preventive or defensive measures, which could contribute to an underestimation of economic cost. For example, asthma can

be controlled with maintenance treatment. Many asthma patients experience mild symptoms and treat themselves with medication instead of reporting to a GP. Such cases are not captured in the GP reports. Asthma also affects people chronically, and the estimate only captures exacerbation due to fl uctuations in pollution levels.

As the clinical survey was based on respiratory visits to local GPs, the study excluded hospital admission and emergency room visits. Patients with severe asthma attacks, who normally go

to the hospital emergency department rather than to surgeries, have not been included. In many cases, asthma imposes signifi cant costs on persons with symptoms and their families.

Researchers have used the cost-of-illness method to estimate the direct and indirect costs of asthma prevalence for several developed economies, including the US, Canada and the United Kingdom (UK). Barnes et al. (1996) tabulated summary measures from nine studies in which direct costs typically contributed 50 to 60% of total costs.

In one of the earlier studies assessing the economic costs of air pollution, Ransom and Pope (1992), compared hospital admissions and mortality data before and after the temporary closure of a steel mill in a mountain valley in central Utah. They estimated that the annual increase in hospitalisation costs was US$2 million and more than US$40 million in mortality costs, due to particulate emissions.

Zaim (1997) estimated that by reducing its air pollution to WHO levels from 1993, Turkey would have reduced annual hospital admissions for respiratory diseases by 5480, annual emergency room visits by 112,100,

avoided 6.85 million restricted activity days per year and 73,000 cases per year of low respiratory symptoms in children 0-12 years of age. The estimated annual economic value of avoiding these effects represented nearly 0.08% of Turkey's 1993 gross national product.

It is clear from the above that inclusion of emergency room visits, hospital admissions and mortality would substantially increase the estimate of the economic cost of particulate air pollution in Armidale.