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ASTHMA AND AIR POLLUTION IN SYDNEY

Visible air pollution in the Sydney metropolitan area on May 5, 6, 7 and 8, 1991 — caused by burning of firebreaks to the west and south-west of Sydney — was reported vividly in the press[1]. The news reports highlighted the fact that asthma is very common among our schoolchildren: 15 per cent of children report a doctor diagnosis of asthma and 20 per cent report a convincing history of asthma symptoms[2]. The reports implied that air pollution is a major cause of childhood asthma.

To investigate a possible link between this episode and asthma, we counted asthma attendances over a three-week period which straddled the episode — from April 28 to May 18. We chose to survey five metropolitan hospitals: Liverpool, Mt Druitt, Westmead, Prince of Wales and Sutherland, on the basis of their size, location and reasonable proximity to air pollution monitoring stations.

All attendances at these hospitals for either asthma or wheezing were identified from the triage register of each Accident and Emergency Department. Hourly ambient levels of ozone, oxides of nitrogen and particulates were obtained from the Sydney Air Pollution Monitoring Network operated by the State Pollution Control Commission. For this study, the only particulate data available was for smoke and dust particles with a mean aerodynamic diameter less than 2μm.

Between May 5 and 8, particulate levels were high at every monitoring station in the Sydney metropolitan area. The highest levels were at the Woolooware recording station (Fig 1). The peaks observed here between 6am and 8am also occurred at other stations, but were smaller. Levels of the other major pollutants were below average and well below existing air quality standards in NSW.

When we pooled the number of asthma attendances at all five hospitals there was an apparent excess in the number of cases attending on Monday, May 6 — the second day of the pollution episode. Peaks also occurred on each Sunday in this period, no matter what the pollution level (Fig 2).

An analysis of variance of data from individual hospitals was used to compare the mean number of attendances for asthma over the four days of high pollution with the 17 days of low pollution. We adjusted for the rise in attendances seen every Sunday. At Sutherland and Prince of Wales hospitals there were statistically significant rises in the mean number of attendances on high pollution days. At two of the other hospitals there was a small increase and at the third a small decrease in mean asthma attendances on the days

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of high pollution (Table 1). None of these variations was statistically significant.

The rise in attendances on one day, May 6, at Prince of Wales accounted almost entirely for the increase seen at that hospital and at all hospitals combined. The large increase on this day at Prince of Wales did not occur on the day of highest pollution in that area. On the day after this large increase, when pollution levels were even higher, asthma attendances at Prince of Wales Hospital were lower than average. There was no statistically significant correlation on a day-to-day basis between measurements of particulate pollution either on days of high pollution ($r = -0.35^a$, $p = 0.65$) or on days of low pollution ($r = -0.32^a$, $p = 0.21$). Similarly, the levels of particulate pollution and asthma attendances the next day and the day after were not significantly correlated.

These data provide weak support for a link between the episode of particulate pollution in Sydney in May and asthma attendances at five metropolitan hospitals over the same period. Against such a link are the facts that a substantial rise in attendances was seen at only one hospital in Sydney and that the day-to-day correlation of attendances with particulate pollution levels was poor. Furthermore, asthma attendances normally rise in May and remain high through the winter months, probably as a result of a higher number of respiratory infections in the community. These seasonal factors may have been the cause of some of the increases observed.

There are limitations to the interpretation of these data. Three weeks is too short a time to assess fully the seasonal and weekly variation in asthma attendances. The influence of behavioural factors on these attendances, particularly the public response to media reports, is unknown.

[a] Pearsons correlation co-efficient

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EDITORIAL NOTE

This is one of the few occasions in which routinely collected air pollution monitoring data has been used to study possible links between air pollution and asthma in Sydney. The air pollution episode in May 1991 may have been prevented by better timing of controlled burning. Smoke can provoke broncho-constriction and an increase in asthma attendance would not be surprising after such an event. A number of other reports have shown an association between the prevalence of asthma and bronchitis and particulate pollution caused by industrial emissions[3,4] and wood smoke[5].

The adverse effects of projected urban development in the west and south-west of Sydney on air quality were highlighted in a recent report[6]. These projections and the findings of this study underline the need for better evaluation of associations between all major air pollutants and illness and mortality in our cities.

Acknowledgements: Margaret Williamson, Helen Moore, State Pollution Control Commission, staff of Casualty Departments at Mt Druitt, Liverpool, Prince of Wales, Westmead and Sutherland hospitals, Eastern Sydney Public Health Unit, South West Sydney Public Health Unit, Western Sydney Public Health Unit.

1. *Sydney Morning Herald* May 7, 1991.
2. Bauman A personal communication.
3. Dockery DW, Speizer FE, Stram DO, Ware JH, Spengler JD, Ferris BJ. Effects of Inhalable Particles on Respiratory Health in Children *Am Rev Respir Dis* 1989; 139: 587-594.
4. Pope CA. Respiratory Hospital Admissions associated with PM[11] pollution in Utah, Salt Lake, and Cache Valleys *Arch Environ Health* 1991; 46: 2 90-97.
5. Duclos P, Sanderson LM, Lipsett M. The 1987 forest fire disaster in California: assessment of emergency room visits *Arch Environ Health* 1990; 45: 1 53-58.
6. Johnson G, Hyde R. Evaluation of air quality issues for the development of Macarthur South and South Creek Valley regions of Sydney. NSW Department of Planning Report December 1990.

FIGURE 1

MEASUREMENTS OF PARTICULATE AIR POLLUTION (SMOKE) MEASURED BY NEPHELOMETRY, WOOLOOWARE MONITORING STATION, MAY 5-8, 1991

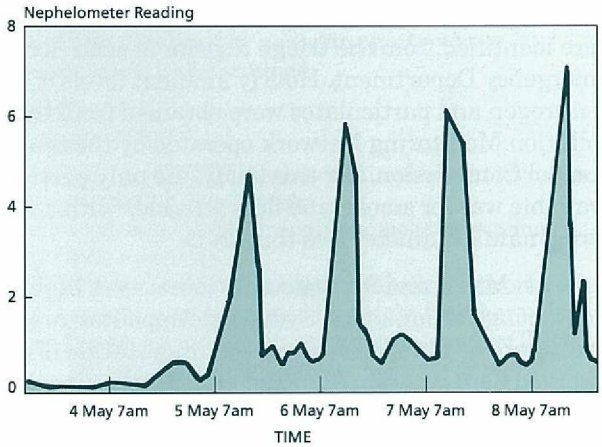

TABLE 1

MEAN NUMBER OF ATTENDANCES AT FIVE SYDNEY HOSPITALS ON DAYS OF HIGH AND LOW PARTICULATE POLLUTION, SYDNEY, MAY 1991

HOSPITAL	HIGH-POLLUTION DAYS†	LOW-POLLUTION DAYS†	p value‡
Prince of Wales	12.6	7.5	0.03*
Sutherland	6.3	4.2	0.02*
Westmead	5.3	5.7	0.81
Liverpool	5.4	4.4	0.37
Mt Druitt	4.7	4.3	0.35
All hospitals	**34.3**	**26.1**	0.001*

† Mean of all pollution or non-pollution days, excluding Sundays. Pollution days were defined as days of high visible air pollution. Nephelometry readings on these days were higher than at any other time in the three-week period
‡ Probability of observed number of cases compared to mean on non-polluted days, after adjustment for the increased number of attendances on Sundays
** $p < 0.05$*

TRAINING FOR A HEALTHIER FUTURE

The NSW Health Department established the NSW Public Health Officer Training Program in 1989 to develop public health professionals for the State's evolving public health network, which has been described in previous issues of the Bulletin[1,2,3]. The program aims to provide practical training with strong emphasis on epidemiology and strategic planning.

Professionals with at least three years' experience in health who have completed the course work for a Master of Public Health degree (or equivalent) are eligible to join the program, which comprises 16 Public Health Officers (PHOs): 11 medical practitioners and five with backgrounds in pharmacy, physiotherapy, anatomy, medical records administration and occupational health and safety. The program seeks participants who are committed to public health practice, have high academic standards and, most importantly, demonstrate enthusiasm.

The program aims to develop PHOs' ability to:

- utilise epidemiologic methods to determine the actual or potential burden of illness affecting a population and the efficacy and effectiveness of prevention and control measures
- identify health priorities for a community and recommend strategies to alleviate problems and promote health
- advocate the improvement of the health of the community to governments and others responsible for resource allocation
- communicate effectively with other health professionals and the public, through public presentations, written reports and scientific articles
- apply management principles to public health practice
- work successfully in multidisciplinary teams

For three years PHOs rotate through placements, ranging from 6 to 24 months. The placements offer opportunities to gain experience in different facets of public health practice and investigation, and have included:

- the Epidemiology and Health Services Evaluation Branch — communicable disease control, environmental health, chronic disease and injury prevention, reproductive health and health services evaluation
- the Department of Public Health, University of Sydney
- Public Health Units in Sydney, Newcastle and Wollongong
- the Centre for Health Economics and Evaluation
- the NSW Central Cancer Registry
- the Sydney Hospital AIDS and STD clinical services

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FIGURE 2

ASTHMA ATTENDANCES AT FIVE SYDNEY METROPOLITAN HOSPITALS AND LEVELS OF PARTICULATE POLLUTION, APRIL 28-MAY 18, 1991