BLOOD LEAD LEVELS OF CHILDREN, TRAFFIC, PAINT, AND SOCIAL DISADVANTAGE

In the Bulletin’s previous issue focusing on lead (November 1995), Alperstein and Aldrich et al. discussed aspects of traffic related to environmental health and detailed the low average mean blood lead levels of children living near a motorway.

Coe et al. noted that “trade offs will be required between the level of risk and the economic resources that are available to manage risks”.

Problems may arise when community concern demands a public health response but the perception of risk does not have a scientific basis.

Blood lead levels are determined by intakes from sources such as lead in car exhausts and paint. Bioavailability is important.

In 1986 unleaded petrol was marketed in Australia and subsequently the use of leaded petrol decreased. In 1996 the maximum allowable petrol lead became 0.2 g/L.

Epidemiological studies

Although experimental data have shown that exhausts may be a major source of lead, population data are less consistent. There have been national surveys in the United States, the United Kingdom and Australia. Some medical findings have been difficult to interpret. In recent years investigational and analytical techniques have improved. It may be possible to quantify any relationship between traffic density and the average blood lead levels of children.

In Culver City, California, there were no appreciable differences in the blood lead levels of those living or going to school at distances from 200 to 2,800 feet from a freeway used by 200,000 cars daily.

Woodstock, Cape Town, is predominantly a working-class area. The income of mixed-race persons is substantially lower than that of white persons, who have better homes. In a survey of blood lead levels, 13 per cent of mixed-race children, but no white children, had blood lead levels of 1.21 µmol/L (25 µg/dL) or more. The means, respectively, were 0.87 µmol/L and 0.58 µmol/L (18 µg/dL and 12 µg/dL).

Those living near heavy traffic had levels 0.24 to 0.34 µmol/L (5 to 7 µg/dL) higher than those elsewhere. Daily traffic ranged from 240 to 20,000 cars. Lead in petrol was 0.836 g/L. Socially disadvantaged groups were at a higher risk of exposure and “indirect ingestion of lead-rich dust” contributed to blood lead levels.

A survey of primary-school children living near a motorway used by 15,000 cars daily near Newcastle, NSW, showed that lead burdens did not increase in the first year after the opening of the motorway in June 1995. This may have been partly because of protective barriers. About half the vehicles were using unleaded petrol. In 1994, the mean blood lead level of 95 children was 0.30 µmol/L (6.16 µg/dL). Four per cent of the children had blood lead levels of 10 µg/dL or higher; 10 µg/dL or less is the goal for all Australians.

In 1994, the mean blood lead level of 1,575 children was 0.28 µmol/L (5.72 µg/dL). The mean for those living within 25 m of a major road (more than 5,000 cars daily) was 0.29 µmol/L (6.0 µg/dL). The mean for persons in areas where there was no traffic count was 0.30 µmol/L (6.2 µg/dL). No statistically significant blood lead gradient associated with increase in traffic was found. However, there were gradients for factors such as the age of houses and pica. The blood lead levels of Aborigines and Torres Strait Islanders (0.36 µmol/L) exceeded those of other Australians. However, after adjustment for other variables, the difference was not significant. The national survey referred to factors such as traffic, low incomes, ill-health and paint. There was a strong association between paint and blood lead levels. A high mean value (0.4 µmol/L, 8.3 µg/dL) resulted from severely chalking paint. There were correlations between blood lead levels and cleanliness of homes and the frequency of pica.

Comments

Alperstein stressed the importance of surveying groups of pre-school children, including those at risk from paint or proximity to roads with heavy traffic (about 30,000 cars daily). Further debate is needed.

In 1993, the National Health and Medical Research Council revised its guidelines. For all children, the goal should be “below 10 µg/dL” (0.48 µmol/L). These guidelines should be used widely.

Reports have shown that the blood lead levels of non-white children usually exceeded those of white children. The reasons include sociodemographic and economic factors. There are about 3.6 million pre-1971 houses that may have been painted with lead-based paint. Also, paint may recontaminate houses. Therefore, such houses should be treated.

Donovan, in the Australian National Survey report, was not very critical about traffic and blood lead levels. The effect of major roads was not statistically significant. There was no blood lead gradient associated with increasing traffic.

Donovan stated that the mean level of 0.28 µmol/L (5.72 µg/dL) may have been contributed to by “children living in low income or older homes”. Donovan was aware of a 1996 Sydney study.

Importantly, Donovan stated that Australian children with high blood levels are “among the most disadvantaged.” Action to alleviate this... may in the long term be more beneficial than action directed specifically at exposure to lead. I agree.

Alan Bell
Formerly consultant to the Associated Octel Company Ltd, Melbourne
January 21, 1998
Response from Dr Garth Alperstein, Central Sydney Area Health Service

Dr Bell makes two points:

- that lead-based paint as a source of lead exposure requires further attention
- that he believes, as does Dr Donovan, that alleviating social disadvantage may in the long term be more beneficial than action directed specifically at exposure to lead.

I do not believe anyone would disagree on either issue. Alleviating social disadvantage is a complex and difficult long-term issue and will positively affect more than just those problems associated with lead exposure. In the meantime, there are simple measures that can be implemented to reduce children’s exposure to lead. How much effort, money and human resources are put into dealing with all health issues, including lead, are what governments and the community are constantly negotiating.


HU NTER AREA PUBLIC HEALTH UNIT

In the North Lake Macquarie area, the Hunter Area Public Health Unit has been undertaking programs and research on lead issues:

- analysis of blood lead levels of children in the suburbs of North Lake Macquarie, and relevant comparisons
- ongoing evaluation of children’s blood lead levels after household remediation
- a knowledge, attitudes and practices survey of parents whose homes have been remediated.

The North Lake Macquarie Remediation Centre was established at the end of 1995 with funding of $300,000 from the NSW Government Environmental Trust, the NSW Health Department, Pasminco Metals–Sulphide and Lake Macquarie City Council. In 1996, the Centre started remediation of houses around the Pasminco Cockle Creek smelter, where children had high blood lead levels.

CENTRAL SYDNEY AREA PUBLIC HEALTH UNIT

Central Sydney Public Health Unit convenes quarterly meetings of the multidisciplinary Lead Advisory Committee. The committee has representation from the Central Sydney Public Health and Health Promotion Units, local Divisions of General Practice, the Lead Reference Centre, the Lead Advisory Service (NSW), the Department of Housing, and the paint industry, as well as the Central Sydney community paediatrician and a local council environmental health officer. The committee aims to reduce the effects on health of lead and the risks from lead within the Central Sydney Health Area by promoting and coordinating responses to lead within the Area, and liaising and collaborating with organisations outside the health sector.

The committee also functions as a forum for information sharing about lead issues generally. In July 1997, a subcommittee was established to look at research issues. The Lead Research Sub-Committee aims to advise the Lead Advisory Committee and others about needs for research about lead, and to formulate research questions about lead issues.

A public health officer placed in the Central Sydney Public Health Unit undertook a literature review to examine evidence of the effectiveness of behavioural interventions aimed at health professionals, families and others to address lead issues.

The Central Sydney Area Public Health Unit developed a local protocol for the follow-up of notifications of people with elevated blood lead levels. This protocol was used to investigate cases of elevated blood lead levels in the Central Sydney Area before the NSW Health guideline for Environmental Health Officers became available.

The protocol’s public health unit operational summary, the letter to general practitioners about adult notifications, and the notification action checklist were used as examples in the NSW Health Department guideline.

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