Letter to the Editor

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In the November 1993 edition of the NSW Public Health Bulletin, Corbett and Cowie referred to lead in petrol (Pb-P) and to children’s blood lead (Pb-B) levels and recommended the increased use of unleaded petrol (ULP). When Pb-P is phased down the aromatic hydrocarbons in petrol are increased (Figure 4), resulting in higher air levels of carcinogenic benzene and other air toxics. In some countries this has increased the risks of leukaemias in the general community and occupationally. Therefore, it is not medically appropriate to consider lead only when changes are made to the composition of petrol.

Lead

The Bulletin article stated that from 1976 to 1990 in the US, Pb-P phasedown was “associated with a significant reduction” in mean Pb-B levels. As shown in Figure 5, Pb-Bs in the US have been declining and continue to decline independently of the increased use of Pb-P. After the UK phasedown from 0.4 grams/litre to 0.15 grams/litre, tests showed that although a 63 per cent decline in air lead levels (Pb-A) reduced Pb-B levels in those living near major roads, the data suggest that dietary lead intake, rather than Pb-A or leaded dust, was the “major contributor” to Pb-B levels.

By 1988 Sydney’s Pb-A (Figure 6) were below the National Health and Medical Research Council (NHMRC) recommendation of 1.5 pg/ml. Corbett and Cowie expressed concern about raised Pb-B levels. They did not state that the average level in a 1993 survey of 252 Melbourne children was only 5.4 pg/dL. Other recent studies, not involving contaminated soil, have reported Pb-B levels similar to Victoria.

Reference was made to a review by the South Australian Health Commission, tabulating Pb-B levels from 1975-1990, and an estimate that “45 per cent of preschool children have Pb-B levels about 10 pg/dL”. The commission referred to the limitations of its estimates and stressed the need for caution. The findings of the commission’s review—in which more than two-thirds of the surveys were taken from industrial or contaminated sites—are not applicable to current situations. When discussing the “IQ deficit” caused by Pb-B levels, the Bulletin article should have stated that Pb-B levels relate to group averages and therefore cannot be applied to individual Pb-B levels.

Corbett and Cowie stated that a NSW cost-benefit analysis was being prepared incorporating “loss of IQ”. The US Environmental Protection Agency (EPA) 1989 statistical lead uptake model used in many Australian calculations and cost-benefit analyses has been superseded. The validity of Australian estimates must be re-examined in light of this revision and should include estimates of petrol-related cancers. In California the cost per “case avoided ranges from $22 to $40 million”

Aromatic hydrocarbons

As lead is phased down, aromatic hydrocarbons are usually increased. During the combustion process benzene and other carcinogens are produced. Benzene does not have to be present in petrol for benzene to be produced. The government and industry should be aware of this and take action to prevent the production of lead compounds in petrol.

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Corbett S, Cowie C. A Clever Country - The health benefits of removing lead from petrol.

As lead has been phased out, fuels have become morepolluting21. The NRIVIA has stated that "if the oil industry cannot reduce lead without increasing benzene, the timing of Pb-P will be eliminated by 2007.

Because of the risk of lead poisoning, the European Commission has recommended a moratorium on the use of unleaded petrol with a high aromatic content in carsa with no catalysts.

In 1994 the Federazione Nazionale Pro Natura requested the Italian Government committee, possibly large numbers of leukaemias in children partly related to travelling in cars'7, as estimated by an American expert panel recommended an air quality standard for benzene of 1.3 ppb in the event of breast cancers from aromatics'. There are additional leukaemias and lung cancer studies. The timing of Pb-P will be eliminated by 2007.

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Toluene air levels were much highern. Associated Octel commissioned a university to determine air toxics study. Report 420-R-93005. EPA, Office of Mobile Sources.

The benzene results are shown in Table 4.

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We would like to offer the following comments in reply to Dr Bell's letter about our article on lead in petrol.

References

23. Young Hit, Dawson M. Continuous monitoring of ambient toxic air levels. Medicine, 1993.
In Australia, the average level of benzene in both leaded petrol and unleaded petrol varies depending on the fuel batch, because of variations in the crude fuel stock and blending operations which can be achieved at cost to the refinery. When the lead level in leaded petrol in NSW was reduced from 0.4 to 0.3 g/L in February 1994, octane rating was also increased. Benzene content fell by the addition of benzene and other aromatic hydrocarbons (PAHs) as alternatives to lead in petrol: benzene is an acknowledged cause of leukaemia. Although benzene is not directly comparable to the Australian situation, the fall in benzene levels in the US has ignored the issue of octane rating, which is critical to his context. In Australia, we are seeking to lower lead in petrol by improving its refining technology.

According to the Australian Institute of Petroleum (AIPE), the reduction of lead in petrol in Europe is accompanied by a decrease in benzene and other aromatic compounds used when lead in petrol is reduced. This graph is not relevant in the Australian context. In Australia, unleaded petrol has a Research Octane Number (RON) of 91 and leaded petrol has a RON of 95 and 98. Dr Bell has ignored the issue of octane rating, which is critical to his context. In Australia, the introduction of unleaded petrol was accompanied by an increase in the volume of aromatic compounds used when lead in petrol is reduced. This is reflected in the increase in benzene or other aromatics in petrol-air mixture in a car engine: a higher octane rating ensures higher compression and greater engine efficiency. Dr Bell has mentioned the increase in the volume of aromatic compounds used when lead in petrol is reduced. This is reflected in the increase in benzene or other aromatics in petrol-air mixture in a car engine: a higher octane rating ensures higher compression and greater engine efficiency.

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Although the effect of an average loss of 2-3 IQ points may be difficult to detect in an individual, its consequence on the general child population is considered to be significant. The association of blood lead with decreasing cognitive teaching will increase.

The South Australian Health Commission7 stressed the need for caution in interpretation of its results. In our article we agreed that the prevalence of children with blood lead levels above 10 pg/dL was likely to be lower than 45 per cent. Recent NSW studies of children living in non-point source areas have found slightly higher mean blood lead levels: a blood lead level above 10 pg/dL, and a mean of 11.4 pg/dL in the inner western suburbs of Sydney7 with about 50 per cent of children with blood lead levels 1.4 pg/dL higher in the inner city compared with non-urban areas.8

We maintain that it would be irresponsible to allow continued dispersion of lead from a known source, while there is still a significant number of children with blood lead levels above the national goal for blood lead of 10 lg/dL. US data indicate that even further reductions in blood lead can continue to be achieved. This is important as there is yet no evidence of a threshold level of lead below which no effects occur.

Abstract

8. Cowie C, Black D, Ferson M et al. Blood lead levels in 1-4 year-old children attending child health centres in the Northern Districts PHTJ in Tamworth while Dr John Hall in the Western NSW PHTJ in Dubbo and Ms Christine Robertson has been acting as Director of the Central Coast PHII, freeing Dr Rod Kennedy for service with the Central Sydney Public Health Units. Dr Peter Lewis has been appointed Director of the Northern Districts PHTJ, while Dr Jeremy McAnulty has been appointed Director of the Southern Sydney PHTJ, as separate entities. Dr John Hall in the Western NSW PHTJ in Dubbo and Dr Paul van Buynder is the Director of the South Eastern NSW Public Health Unit.

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There is little doubt that blood lead levels have been a major health concern, particularly in the context of fuel additives, leaded petrol, and the removal of lead from soldered cans. Although the effect of an average loss of 2-3 IQ points may seem small, the cumulative effect over time and across populations has significant implications. The elimination of lead in petrol and the banning of lead-based paint have contributed to the decrease in air lead levels, reflecting a decline in the general child population considered to be significant. The development has been measured on a population basis, with areas found having slightly higher mean blood lead levels: recent NSW studies of children living in non-point source areas have found slightly higher mean blood lead levels compared to those living in metropolitan areas.

Despite the fall in blood lead levels, recent surveys indicate that there is still a significant number of children with blood lead levels above the threshold of 10 pg/dL. An opportunistic survey in a paediatric population in Newcastle found a blood lead level above 10 pg/dL in 1.4% of children with blood lead levels 1.4 pg/dL higher in the inner city compared with non-inner suburbs of Sydney, with about 50% of children with a blood lead level above 10 pg/dL in Eastern Sydney, with 12.6% above 7 pg/dL. Recent surveys indicate that the prevalence of children with blood lead levels above 10 pg/dL was likely to be lower than 45 per cent, and that the proportion of children with low IQs requiring remedial teaching will increase.

The South Australian Health Commission stressed the need to continue to monitor blood lead levels and to implement effective public health interventions. Dr Dell asserts that the review of blood lead data made by the NIHIMRC's statement on the health benefits of removing lead from petrol other than lead is required. However, if it is decided that alternatives are available, it is important to maintain a threshold level of lead below which no effects occur. We maintain that it would be irresponsible to allow any threshold level of lead to be set.

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