

matters arising

Lead levels in blood

THE article¹ by Waldron is misleading in its interpretation of the data selected, and in inadequate reference to the variables that were introduced during the period of the investigation, which in themselves precluded any reliable comparisons that might reasonably have been made between the series.

Waldron compared lead concentrations of capillary blood in the series one group of subjects, when it was accepted that the samples were suspect for reasons of contamination and haemo dilution², with venous blood samples from the same group of subjects in the second and third series, all of whose samples were analysed at the same laboratory. He did not, however, point out that 41 of these same individuals (18 males and 23 females) also gave capillary samples of blood in the second series. For valid comparisons to have been made between the series it would have seemed appropriate, in view of the transition from capillary to venous samples, to have included the matched capillary sample results of the series two group.

An assessment of the data in respect of the 41 subjects who provided capillary samples only in series one, capillary and venous samples in series two and venous samples only in series three is shown in Table 1. The mean values

nature of the series one capillary samples, his suggestion that the series two results support a rise in the blood lead concentrations cannot be properly upheld, as is shown by the results given in the Table.

Scrutiny of all of the main data showed no consistent differences in the three series of blood lead concentrations in the population in relation to residential distance from the motorway. Also, the ratio difference between the sexes remained virtually unaltered throughout the series. Had lead from the motorway been responsible for the increase in the blood levels observed, it would have been reasonable to have expected those living nearer to the motorway to have shown higher blood lead values than those living further away and difference in the ratio between the sexes to have diminished by virtue of absence of the majority of the male population at their various places of work during the day.

No control group was included in the study, a serious defect of the investigation, and no reference laboratory was used, which in view of the lack of agreement between the two laboratories engaged in the study, would have been of corrective value.

The lead in air findings of Butler *et al.*³ showed a low average concentration of 1 µg Pb per m³ air, as noted by Waldron. The apparent increases in

inconsistent with his notion that the aerosol is behaving as a gas.

The fact is that the lead in air findings of Butler *et al.* do not tie in with the increase of blood lead concentrations reported in the population under investigation. Because of inconsistencies and anomalies inherent in the investigation the results cannot be interpreted with any predictable level of confidence or be attributed to lead from traffic using the motorway.

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- ¹ Waldron, H. A., *Nature*, 253, 345 (1975).
² Report of the Senior Administrative Medical Officer for Environmental Services to the Health Committee of the City of Birmingham, July 13, 1973.
³ Butler, J. D., Macmurdo, S. D., Middleton, D. R., *Motor Vehicle Generated Pollution in Urban Areas*, Association of Public Health Inspectors Environmental Health Congress, Torbay, 1974.

WALDRON REPLIES—Barry's contention¹ that the blood lead levels in residents around Gravelly Hill have not been affected by the opening of the motorway link does not seem convincing. There is no *a priori* reason to suppose that one set of results is any more, or less, reliable than the other, and so the proper course should be to discover the mechanism whereby the blood concentrations have become elevated to their present levels. An investigation of the physical and chemical properties of the atmospheric lead particles seems at least one way in which this might be tackled.

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- ¹ Barry, P. S. I., *Nature*, 258, 775 (1975).

Natural halocarbons in air and sea

THE amount of stratospheric chlorine released from natural CH₃Cl (ref. 1 and R. A. Rasmussen, personal communication), though certainly of scientific interest, is basically of slight relevance in consideration of the potential hazards to stratospheric ozone from chlorine atoms released from anthropogenic molecules such as CCl₂F₂ and CCl₃F (refs 2-4). In the first place, molecules such as CCl₃F have long atmospheric lifetimes

of the capillary blood lead results were comparable in series one and series two, but venous blood lead results showed an increase from series two to series three. In view of various anomalous aspects of the whole study these results require to be considered with circumspection.

Waldron's finding that capillary samples gave higher values than venous samples in a group of 96 individuals (from series two only) has been confirmed by other studies. Only 41 of these, however, could be directly compared with other series one results, so that, in conjunction with the suspect

blood lead levels at such low concentrations of lead in air are not supported by other published data. Neither can the suggestion that the pulmonary uptake of the lead aerosol from a motor vehicle exhaust may be considerably higher than 37 per cent be upheld in the light of the results of a recent study to be published shortly.

The apparent changes in blood lead levels force Waldron to include the possibility of 'the ingestion of lead contaminated dust'. Any particle size distribution, however, which would result in lead from motor vehicle exhausts being deposited in the dust must be

Table 1 Mean blood lead concentrations (µg Pb per 100 ml)

	No.	Series 1	Series 2		Series 3
		Capillary	Capillary	Venous	Venous
Males	18	18.1	17.6	16.8	25.6
Females	23	12.5	12.9	12.2	19.5