

Antimony, cot mattresses, and SIDS

SIR—Consideration of the possible causes of sudden infant death syndrome (SIDS) was raised again by Thompson and Faull (Dec 9, p 1557)¹ who fail to support the hypothesis that microbial growth on cot mattresses generates volatile hydrides.² However, this work does not address other issues presented at the time of the Cook Report television programmes in 1994, some of which have been subject to further investigation.

We investigated the plausibility of the toxic-gas hypothesis by measuring antimony in liver samples collected at necropsy, placed inside polythene tubing, and stored at -80°C from 52 children who died aged 1-12 months. These included 37 cases of SIDS, aged 1-9 months (mean 3.5 months), and 15 cases, comprising a control group aged 1-12 months (mean 4.5 months) who died from other causes. Of the SIDS cases, 30 children died in 1986-88 and seven in 1993-94, while the comparable numbers for the controls was eight and seven respectively. Liver samples were analysed by hydride generation atomic absorption spectrometry. A series of reagent blanks and control specimens were also analysed to detect if there was any undue contamination—there was none, and a trivial amount was found in a sample of the polythene tubing tested to determine if there was potential for transfer of antimony from this material to tissues during prolonged storage. The detection limit was 0.5 ng and as most of the specimens weighed 0.5-1 g the analytical limit of detection was 0.5-1.0 ng/g. There was no measurable antimony in 14 of the non-SIDS specimens, the remaining control sample contained 1.65 ng/g. By contrast, antimony was found in 20 of the SIDS specimens. The mean antimony concentration in the SIDS group was 7.11 ng/g and the mean in the nonSIDS group was less than 0.5 ng/g. Contradictory results, however, have since been obtained from another nine frozen liver specimens from recent SIDS cases, which had less than 1.5 ng/g. It is possible that children were exposed to source(s) of antimony in 1986-88 that have since been removed. Five historic wax-embedded samples were examined and had concentrations of up to 84 ng/g dry weight. Therefore, liver specimens from seven children, treated in three different ways—frozen, formalin-fixed and wax-embedded—were analysed (table), and confirm that such samples cannot be used for assessment of exposure to antimony.

Child	Frozen	Formalin fixed	Wax embedded
1	nd	3.92	..
2	nd	9.12	50.2
3	nd	3.99	nd
4	nd	8.33	4.52
5	1.81	1.13	34.13
6	0.82	5.09	44.25
7	8.35	9.96	11.14

nd=not detected.

Samples kindly provided by Dr D Fagan, Queen's Medical Centre, Nottingham.

Table: Antimony (ng/g) in frozen, formalin-fixed, and wax-embedded liver specimens from the same children

We also measured antimony in hair samples. Concentrations in 11 mothers (15-42 ng/g) were consistently lower than in their 0.5-3.5 year old children (50-170 ng/g, n=14). The consistent difference between the hair antimony levels of the mothers and their children suggests some exposure to the element from the childhood environment. The mothers all denied that smoking occurred within the homes. Metals can be incorporated onto hair from external sources³ but antimony was not detectable in the Shampoo used in these families. As yet there is no explanation for these observations. Your editorial⁴ points out that a link between SIDS and cot mattresses was first described in 1989, and it has been proposed that recommendations on mattress use made at that time were responsible for the initial fall in the number of SIDS cases. If this is correct it could be an explanation for the failure to confirm increased liver antimony in the more recent specimens.

The data presented here are consistent with some undue exposure to antimony in infants who died of SIDS although they give no indication of a source or route.

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- 1 Thompson M, Faull JL. Do microbiota cause emission of stibine from cot mattresses? *Lancet* 1995; 346: 1557-58.
- 2 Richardson BA. Cot mattress biodeterioration and SIDS. *Lancet* 1990; 335: 670
- 3 Taylor A. Usefulness of measurements of trace elements in hair. *Ann Clin Biochem* 1986; 23: 364-78.
- 4 Editorial. SIDS theory: from hype to reality. *Lancet* 1995; 346: 1503.