

## Cot death controversies

**To the Editor:** Kibel *et al.*<sup>1</sup> begin their editorial with the words 'Uncertainty as to the cause of cot death....'. There is no uncertainty, as the cause has been fully elucidated.<sup>2</sup> I postulated the cause,<sup>3</sup> and independently Richardson<sup>4,5</sup> proffered the same explanation in greater detail.

There is only one cause of cot death, namely gaseous poisoning by 'nerve' gases evolved by fungal action on certain chemicals in the baby's mattress and certain types of bedding. These contain compounds of the elements phosphorus, arsenic and/or antimony; and the gases are the hydride or alkyl derivatives of the elements. Their 'nerve' action arises because they are anticholinesterase agents that suppress the transfer of nerve impulses to the lungs and heart. This is proved by the following: (i) every facet of cot death is compatible with this finding; (ii) an intervention based on this explanation has proved to be 100% effective in preventing cot death, namely the 11-year nation-wide 'mattress-wrapping' programme in New Zealand; and (iii) the substantial reduction in the New Zealand cot death rate during that period, following a 3 year period during which the NZ cot death rate was static.<sup>6</sup>

Inexplicably controversy nevertheless remains, but with no scientific basis. Why was this simple and cogent explanation for cot death not discovered much earlier? As long ago as 1983 it became apparent to me that cot death is due to environmental poisoning and that the prime reason for the failure by researchers and others to realise this fact is because the term Sudden Infant Death Syndrome (SIDS) was adopted. This led medical people and researchers, to believe that cot death was a syndrome, thereby conveying the impression that there were medical causes. But by definition it is not a 'syndrome' as this is defined in the New Oxford Dictionary as, namely 'Concurrence of several symptoms in a disease; set of concurrent symptoms characterising it'. There is no disease associated with cot death, nor are there any observable or described symptoms – the only commonality is death itself. Therefore the term SIDS is incorrect and should be abandoned. Beckwith, who suggested the term 1969<sup>7</sup>, stated recently that 'If a prize were offered for the poorest definition of a disease or disorder in the scientific literature, this one would be a strong contender'.<sup>8</sup>

Once the cause of cot death had been determined it was a simple matter to devise an intervention. Richardson<sup>5</sup> suggested the use of sheet polyethylene as a barrier. I developed a slip-on, gas-impermeable mattress cover (the Babe-Safe cover) and also specified the bedding be confined to cotton only beneath the baby, and cotton or wool above. This 'mattress-wrapping' technique<sup>9</sup> ensures that the baby is not exposed to any gas from either the mattress or the bedding and has proved to be totally effective in preventing cot death. The level of proof is beyond doubt as the calculated p-value for the New Zealand mattress-wrapping programme was less than  $1.9 \times 10^{-22}$ .<sup>10</sup>

Kibel *et al* use the terms 'vulnerable period' and 'vulnerable infant', but this is not meaningful, as every baby is vulnerable if exposed to the gas/es; the vulnerable period for the poisoning to cause death being the age range when

the baby is unable to react to the poison. They list several so-called 'risk factors', but no 'risk factors' actually cause cot death. The extensive epidemiology that led to the term 'risk factors', linking sleeping position, excess bedding, maternal cigarette smoking, breastfeeding, vaccination, bed-sharing, and the protective effect of pacifiers (dummies), is all made clear by application of the toxic gas explanation.<sup>11</sup> One must also put aside the 1997 Limerick Report<sup>12</sup> and study critiques of it.<sup>13-15</sup> As noted by Kibel *et al.* this much-heralded report did not disprove the toxic gas explanation but perpetuated cot death for many years, thereby losing an opportunity for saving lives.

Mattress-wrapping saves lives and the toxic gas explanation is correct. But the object surely is to stop babies dying, not to pursue endless disputation.

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**Professors Kibel and Moltano reply:** We thank Dr Sprott for his response to our editorial on cot death controversies. He draws attention to the low rate of cot deaths in New Zealand, which he attributes to the prevention of exposure to toxic gases by wrapping mattresses in polythene, rather than the practice of face-up sleeping during infancy. As he states, face-up sleeping was introduced in New Zealand well before the fall in cot death rates. A change in sleeping position has been responsible for the reduction in cot death rate in many other countries.

The theory that toxic gases are associated with the re-use of mattresses and cot deaths is an attractive one, but is controversial and has given rise to heated debate. Cot deaths are a relatively rare occurrence, and much of the

debate has centred on epidemiological findings, particularly on risk factors. Socio-economic disadvantage, parity and smoking are all factors known to be associated with an increased incidence of cot deaths. However, the use of old mattresses could possibly be a mediator in all of these associated factors. Clearly, the proof of the theory must fulfil Koch's first Postulate, namely the demonstration of lethal gases in used mattresses. Surely in this technological age such demonstration should not pose an insuperable difficulty?

Because of the range of socio-economic levels and the multicultural nature of the South African population, research here could make an important contribution. There are currently exciting research initiatives in this field.

The SIDS 2006 Conference will be held in Japan in June. We hope that Dr Sprott's hypothesis will be discussed fully at this venue, which bring together the world's experts in the field.