



Information Statement

SPECULATION CONCERNING TOXIC GAS FROM MATTRESSES AND SIDS

Rigorously conducted, scientifically based research has concluded that there is no evidence to support the link between wrapping mattresses and the prevention of Sudden Infant Death Syndrome (SIDS).

To Reduce the Risk of Sudden Unexpected Deaths in Infancy (SUDI), including SIDS and Fatal Sleep Accidents

1. Sleep **baby on the back** from birth, not on the tummy or side
2. Sleep baby with **head and face uncovered**
3. Keep baby **smoke free** before birth and after
4. Provide a **safe sleeping environment** night and day
5. Sleep baby in their **own safe sleeping place** in the **same room as an adult care-giver** for the first six to twelve months
6. **Breastfeed** baby if you can

- Some bedding products have been developed on the basis of a theory proposing that toxic fumes are emitted by cot mattresses and may be associated with SIDS deaths. However, major SUDI researchers and Paediatric experts consider that there is insufficient scientific evidence to support the theory.
- SIDS and Kids strongly disagrees with the theory as it is unsupported by the evidence
- SIDS and Kids recommends baby sleeps on a firm, clean, well fitting mattress that is in good condition to reduce the risk of SIDS and fatal sleep accidents

During the 1980s SIDS claimed around 500 babies lives each year. In the early 1990s, SIDS and Kids introduced a health promotion campaign to raise parents' awareness of methods that reduce the risk of SIDS. Since then SIDS rates have dropped 80% saving the lives of more than 7,500 babies.

The SIDS and Kids Safe Sleeping program has specific recommendations for cot mattresses. The mattress should be firm, clean, well fitting and in good condition. A baby can get stuck in gaps between the mattress and the cot sides. This is especially dangerous if their face is trapped and covered, or their neck is restricted in any way.

Make sure there is no more than a 25mm (1inch) gap between the mattress, cot sides and ends. Remove plastic packaging from the mattress. Always make sure the waterproof mattress protector is strong and a tight fit. A pillow or cushion is not a safe mattress. They are soft and may cover baby's face.

The Safe Sleeping program is based on strong scientific evidence, has been developed in consultation with major health authorities, SIDS researchers and Paediatric experts in Australasia and overseas, and meets the National Health & Medical Research Council rules for strong evidence.

Some bedding products have been developed on the basis of a theory presented by Dr Barry Richardson in 1989. This theory proposes that toxic fumes are emitted by cot mattresses and may be associated with SIDS deaths. SIDS and Kids strongly disagrees with the theory and considers that the theory is unsupported by the evidence.

The following presents a summary of these investigations and findings.

Summary

In the United Kingdom, Barry Richardson has, since 1989, made the claim that chemicals in PVC and in the fire retardant that is routinely added to cot mattresses in England give rise to toxic gases. The chemicals are antimony, arsenic and phosphorus.

In 1990 the UK government set up an enquiry into these claims, and found no evidence to substantiate this hypothesis. A second study that replicated the original research was conducted with Richardson's collaboration², but again the findings could not be duplicated.

More recently, one of the world's largest studies of cot death¹ found that babies who slept on PVC mattresses were in fact less likely to die from SIDS than those on other mattresses. In February 1997 a book was published, entitled "The Cot Death Cover-up?" by New Zealander, Dr Jim Sprott, a forensic scientist and consulting chemist, which continues Barry Richardson's conjecture. In it, the author claims that there is one single cause of SIDS: gaseous poisoning from mattresses in PVC and in mattress fire retardant. He also asserts that the danger escalates, as mattresses are re-used. He recommends that any mattress or surface that a baby sleeps on should be completely wrapped by a polythene (not PVC) layer to his specifications. Dr Sprott's hypothesis has received vigorous criticism from major SUDI researchers and Paediatric experts. They consider that there is insufficient scientific evidence to support the theory. Dr Sprott's book is said to contain "factual errors and presents an unproven hypothesis as scientific fact" (Lady Sylvia Limerick, chair of the UK Expert Group on Cot Death Theories). Professor ED Mitchell, Associate Professor in Paediatrics, University of Auckland, is of the opinion that the Richardson theory doesn't meet the characteristics of scientifically valid research i.e. it must be able to be repeated by other researchers; judged methodologically robust by other experienced researchers in the field; published in internationally respected peer reviewed journals; its sources are listed in detail and; it is consistent with previous research results.

Professor Mitchell further argues that, SIDS has occurred long before these chemicals were used, and that SIDS babies have died wherever they sleep, including car seats and parents' arms.

A report published in 1973 shows that antimony is a common element, found in ordinary house dust. This may explain why other investigators found that antimony was present in unborn babies (where exposure through mattresses is irrelevant), and in similar concentrations in babies who slept on mattresses with PVC covers and on other mattresses.

One of the conclusions of the Scottish SIDS Case-Control Study published in the British Medical Journal in May 1997 is that “sleeping on an old mattress may be important [regarding SIDS] but needs further confirmation before recommendations can be made.” The authors of the report say that this is the first study to indicate a small increased risk of SIDS on previously used mattresses.

Recommendations to parents should not address this factor until other independent research has confirmed this result. The finding does not provide support for the toxic gas theory. In fact, the investigation found that there is no increased risk of SIDS for babies on PVC-covered mattresses, contrary to Dr Sprott’s speculation.

Expert Group to Investigate Cot Death Theories: Toxic Gas Hypothesis, UK 1998

On 21 May 1998, the Expert Group to Investigate Cot Death Theories: Toxic Gas Hypothesis, chaired by Lady Limerick and established in 1994 by the UK Chief Medical Officer, presented their final report. Their conclusions are summarized in the article by Dr Susan Beal entitled, ‘the rise and fall of several theories’: Toxic gas from mattresses³. “...there is no evidence to suggest that antimony or phosphorus containing compound used as fire retardant in PVC and other cot mattress materials are a cause of sudden infant death syndrome.’

The conclusion was based on the following:

1. Cot mattress contamination with the fungus *S. breviculis* is rare, and no more common in SIDS mattresses than in other used mattresses.
2. There is no evidence for the generation of gases from phosphorus, arsenic and antimony from cot mattresses, by *S. brevecaulis*, when tested using conditions relevant to a baby’s cot. (The group did, however, identify laboratory conditions, wholly unlike those that could occur in a baby’s cot, in which added antimony is biovolatilised, but to the much less toxic trimethylantimony and not to stibine).
3. There is no evidence of poisoning by phosphine, arsine, or stibine (or bethylated derivatives) in babies who have died of SIDS.
4. Low amounts of antimony can be detected in samples from the majority of live babies, and even newborn babies: the concentrations in the tissues of SIDS babies were not different from those dying from known causes. There are a number of sources of antimony in the domestic environment other than the fire retardant in cot mattress materials.

5. We have found no evidence that the changing rates of sudden infant death correspond to the introduction and removal of antimony – and phosphorus – containing fire retardant in cot mattresses.

The SIDS and Kids Safe Sleeping program is based on scientific evidence and was developed by Australian SUDI researchers, paediatricians, pathologists, and child health experts with input from overseas experts in the field. The 80% drop in SIDS deaths and the more than 7,500 lives that have been saved is testament to the effectiveness of the program.

For further information visit the SIDS and Kids website at www.sidsandkids.org or phone SIDS and Kids in your State or Territory on 1300 308 307.

References:

1. Fleming PJ, Blair PS, Bacon C, Bensley D, Smith I, Taylor E, Berry J, Golding J, Tripp J (1996). Environment of infants during sleep and risk of the sudden infant death syndrome: results of 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. Confidential Enquiry into Stillbirths and Deaths Regional Coordinators and Researchers. *BMJ*. 313(7051):191-5
2. Warnock DW et al (1995). Toxic gas generation from plastic mattresses and sudden infant death syndrome. *Lancet* 346: 1516-1520
3. Beal SM (2001). The rise and fall of several theories. In Byard R W and Krous H F (Eds) *Sudden Infant Death Syndrome: Problems, Progress and Possibilities*. Arnold Publishers, London

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Suggested citation:

SIDS and Kids. National Scientific Advisory Group (NSAG). 2005. Information Statement: Speculation concerning toxic gas from mattresses and SIDS. Melbourne, National SIDS Council of Australia. This information statement was first posted in October, 2005