



## SIDS-protective infant care practices among Auckland, New Zealand mothers

Lynne Hutchison, Alistair Stewart, Ed Mitchell

### Abstract

**Aim** To survey the knowledge and implementation of sudden infant death syndrome (SIDS)-protective infant care practices in mothers of infants aged less than 4 months.

**Methods** A postal survey was carried out of knowledge of SIDS risk factors and infant care practices of 200 mothers with infants aged 6–8 weeks and 3–4 months.

**Results** Mothers who could cite supine sleeping as protective comprised 84%, while 73% knew that smoking was a risk factor. Fewer knew that room sharing, keeping the face clear of bedding, and avoiding bed sharing and overheating are also protective. Fifty-four percent of the infants usually room-share with a parent, while 39% both room-share and sleep in their own bed. Sixteen percent usually co-slept for part or all of the night. Nearly one-third used pacifiers. Mothers who smoked during pregnancy comprised 8%, while 7% had smoked in the last 24 hours. Most infants (97%) had been breastfed at some time.

**Conclusions** Maternal education of the benefits of supine sleeping, not smoking, and breastfeeding appear well understood by these mothers. However, more education is needed about other SIDS-protective behaviours such as keeping the face clear and sleeping the infant in their own bed in the parents' room.

New Zealand research into risk factors for sudden infant death syndrome (SIDS) resulted in the National Cot Death Prevention Programme in New Zealand commencing in 1991 after preliminary results of the first year of the Cot Death Study became available.

The advice at this time concentrated on promoting a smokefree environment for the infant, breastfeeding, and the use of the side or back sleep position (not prone).<sup>1</sup> As further results became available, the message was changed to back or side position, and bed sharing with a smoking parent was added as a risk factor. By 1996-1997, it was evident that the lateral sleep position was also a risk, and sleep position advice was refined to promote the supine position only, with the face clear of any loose bedding or soft objects in the cot.<sup>2</sup>

These recommendations have been taught by Plunket, hospitals, and public health providers, and in 2000 a pamphlet entitled *Back is Best*<sup>3</sup> was released for public health use. This promotes supine positioning; smokefree from conception; face-clear positioning; bedding to be securely tucked in; the use of firm, clean, snug-fitting mattresses; not bed sharing until 6 months of age (especially if a parent smokes); breastfeeding; and information on pacifiers.

Similar prevention messages are provided in the UK by the Foundation for the Study of Infant Deaths (<http://www.sids.org.uk/fsid/>), while in the US, the Task Force on

SIDS of the American Academy of Pediatrics (AAP) has recently issued a policy statement after analysing studies of SIDS prevention in the last 20 years.<sup>4</sup>

This policy statement includes the following recommendations:

- Use the supine sleep position for every sleep;
- Avoid soft sleep surfaces;
- Avoid soft objects in the sleeping environment, and tuck blankets in firmly;
- Do not smoke during pregnancy; and avoid smoking in the infant's environment;
- Place the infant to sleep in their own bed in the same room as the parent;
- Offer a pacifier when placing the infant to sleep;
- Avoid overheating the infant;
- Avoid positioning devices and apnoea monitors;
- Avoid the development of positional plagiocephaly by implementing positioning strategies; and
- Continue public education programmes to teach *Back to Sleep*.

In New Zealand, SIDS is still the major cause of death in the post-neonatal period,<sup>5</sup> although the rate has dropped dramatically in the last 15 years. While the increased adoption of the supine sleep position for infants is undoubtedly a major factor in this reduction, little is known about mothers' knowledge of SIDS risk factors or the prevalence of other SIDS risk-reducing behaviours among New Zealand families.

This study was undertaken to evaluate the knowledge of SIDS risk factors in a group of Auckland mothers of young infants. It also aimed to quantify the prevalence of different infant sleep environments, maternal smoking, breastfeeding, and the use of pacifiers. Reasons for using these infant care practices and concerns about them were also documented.

## Method

A random sample of 400 mothers who had delivered infants at National Women's Hospital, Auckland, were mailed a questionnaire in April–May 2005.

National Women's Hospital is the largest maternity unit in Auckland, delivering 7500 infants per year. Half of the sample infants were aged 6 to 8 weeks, and the other half were between 3 to 4 months. The mothers were encouraged to complete the questionnaire on the day they received it, and a stamped addressed return envelope was included. If there was no response received within 2–3 weeks, then a reminder phone call was made to the mother. In some cases, if a mother requested it, the questionnaire was completed over the phone at the time of the reminder call.

The questionnaire surveyed the mothers' knowledge of infant care practices related to the prevention of SIDS. It asked them to list any factors they knew of that might help reduce the risk of SIDS.

Information was also collected on the respondents' current practices concerning sleep position, maternal smoking, breastfeeding, bed sharing, room sharing, and pacifier use. One reminder phone call was made to the mother if a response had not been received after 2–3 weeks.

The infant's ethnicity was obtained from the mother, while the mother's ethnicity was obtained from the hospital admission record. The final question invited the mother to comment on anything else she felt was relevant.

Statistical analysis was conducted using SAS software (Release 9.1; SAS Institute, Cary NC). The study received ethical approval from the Auckland Regional Ethics Committee.

## Results

**Subjects**—Two mothers responded that their babies (one in each age group) had been adopted or fostered out. These infants were excluded from the analysis as no information was given about them. The remaining responders numbered 278 (70%), with 135 (68%) in the older age group, and 143 (72%) in the younger age group.

The only information available about the non-responders was ethnicity. The ethnicities of the respondents were: 60% European, 4% Māori, 10% Pacific (mostly of Samoan, Tongan, Niuean, or Cook Islands origin), 21% other ethnicity, and 4% not stated. In the whole group, the respective ethnicities were: 50% European, 6% Māori, 12% Pacific, 28% other, and 4% not stated ( $\chi^2=38.2$ ,  $df=4$ ,  $p<0.0001$ ).

Over 90% of the mothers were 25 years of age or older. Approximately half of the infants were firstborn, and nearly two-thirds were European, with the remainder spread approximately evenly between Māori, Pacific, and “other” ethnicities. Twelve percent were preterm.

**SIDS prevention factors cited**—A high percentage of mothers cited back sleeping and not smoking as protective of SIDS; however fewer than half knew that avoiding bed-sharing and keeping the face clear were protective. A small number listed wrong answers. Twenty-four mothers (9%) knew or listed no factors, while a similar number listed one or two factors (Table 1).

Between three and six factors were cited by 73% of mothers, while 7% cited more than six factors. Some factors included in SIDS prevention programmes overseas were also cited, but these were less frequent.

Those mothers who did not cite any factors were less likely to report having received a pamphlet about SIDS prevention (OR=4.35, 95%CI 1.78–11.11), and were more likely to be of Māori, Pacific, or other ethnicities (OR=14.68, 95% CI 4.34–50.76), to be first-time mothers (OR=3.13, 95% CI 1.19–8.33), and to not sleep their infant on the back (OR=3.33, 95% CI 1.39–7.69).

The most common source of SIDS information was a midwife (54%), followed by antenatal class (40%) and Plunket (27%). The media was a source of information for almost 20%, and books for 15%. Less frequently cited sources were friends, family, and the Parent and Baby Show. Seventy percent of mothers reported that they had received a pamphlet about SIDS prevention, most commonly from the hospital, midwife or antenatal class.

**Sleep position**—This has been reported previously.<sup>6</sup> In brief, the positions slept in “last night” were: 72% supine, 14% side, 12% side and back, and 1% prone. The “usual” position was slightly different at 65% supine, 10% side, 22% side or back, and 3% prone.

**Table 1. SIDS prevention factors cited**

SIDS prevention factors	n (%)
Sleep baby on back*	234 (84.2)
Don't smoke during pregnancy or around baby*	202 (72.7)
Avoid bedsharing during sleep*	128 (46.0)
Breastfeed*	96 (34.5)
Keep soft objects and loose bedding out of the cot; keep face clear*	77 (27.7)
Avoid overheating	74 (26.6)
Use a firm sleep surface	47 (16.9)
Avoid using secondhand cot mattresses	26 (9.4)
Use a pacifier at nap time and bedtime	10 (3.6)
Sleep in same room as parent	4 (1.4)
Other—e.g. avoid alcohol/drugs around baby, wrap mattress in plastic, use natural fibres, use clean bedding, aired sleeping space	67 (24.1)
Wrong answer, e.g. side or prone sleeping	7 (2.5)
No risk factors cited	24 (8.6)

\*New Zealand SIDS prevention programme advice.

**Smoking**—Smoking during pregnancy was reported by nearly 8% of mothers, and 7% reported smoking in the last 24 hours (Table 2). For those who smoked during pregnancy, the mean number of cigarettes per day was 7.4 (range 1–25). Higher rates of smoking were found in the Māori and Pacific mothers, at 22% overall, than in the European/other mothers (4%;  $p < 0.0001$ ).

**Table 2. Smoking, breastfeeding, and pacifier use**

Variable	6–8 weeks n (%)	3–4 months n (%)	All infants n (%)
<b>Smoking in pregnancy (missing = 1)</b>			
Yes	13 (9.1)	8 (6.0)	21 (7.6)
No	130 (90.9)	126 (94.0)	256 (92.4)
	$\chi^2=0.96, p=0.32, df=1$		
<b>Smoking in last 24 hours (missing = 7)</b>			
Yes	12 (8.7)	7 (5.3)	19 (7.0)
No	126 (91.3)	126 (94.7)	252 (93.0)
	$\chi^2=1.22, p=0.27, df=1$		
<b>Breastfeeding ever (missing = 1)</b>			
Yes	140 (97.9)	128 (95.5)	268 (96.8)
No	3 (2.1)	6 (4.5)	9 (3.2)
	$\chi^2=1.24, p=0.26, df=1$		
<b>Breastfeeding, last 24 hrs (missing=11)</b>			
Yes	118 (84.3)	94 (74.0)	212 (79.4)
No	22 (15.7)	33 (26.0)	55 (20.6)
	$\chi^2=4.29, p=0.03, df=1$		
<b>Pacifier use last night (missing = 2)</b>			
Yes	41 (28.9)	39 (29.1)	80 (29.0)
No	101 (71.1)	95 (70.9)	196 (71.0)
<b>Pacifier use usually (missing = 3)</b>			
Yes	43 (30.3)	42 (31.6)	85 (31.0)
No	99 (69.7)	91 (68.4)	190 (69.1)
	$\chi^2=0.05, p=0.81, df=1$		

**Breastfeeding**—97% of infants had ever been breastfed, while 84% in the younger age group and 74% in the older group had been breastfed in the last 24 hours (Table 2).

**Pacifier use**—A pacifier was usually used by 31% of infants (Table 2). Almost all mothers whose babies used a pacifier reported using it to settle the baby. Two mothers reported using a pacifier specifically for SIDS prevention. Most mothers had no concerns about using a pacifier, although 18 users (21%) were concerned about the infant becoming dependent. Small numbers reported concerns about misshapen teeth, baby losing it in the night, and safety.

For those mothers who did not use a pacifier for their infants, the main reasons were that the baby didn't need it (33%), wouldn't take it (27%), fears of dependency (16%), and the mother didn't like pacifiers (13%). Smaller numbers were concerned about effect on teeth or mouth shape, choking, hygiene, colic, and hindering breastfeeding.

**Bed sharing**—For the question *What bed did baby sleep in last night/usually?* there was very little difference in bed sharing practices between “last night” and “usually”. Eighty-four percent of infants usually slept in their own bed, while 9% slept in the parental bed and 7% spent time both in their own bed and in the parent's bed (Table 3).

**Table 3. What bed does baby sleep in? (missing=1)**

<b>Last night (missing=1)</b>	<b>6–8 weeks; n (%)</b>	<b>3–4 months; n (%)</b>	<b>All infants; n (%)</b>
Own bed	119 (83.2)	109 (81.3)	228 (82.3)
Parental bed	14 (9.8)	15 (11.2)	29 (10.5)
Both own and parental bed	10 (7.0)	8 (5.6)	18 (6.5)
Twins sharing bed	0 (0.0)	2 (1.5)	2 (0.7)
<b>Usually (missing=1)</b>	<b>6–8 weeks; n (%)</b>	<b>3–4 months; n (%)</b>	<b>All infants; n (%)</b>
Own bed	120 (84.5)	113 (85.6)	233 (84.1)
Parental bed	13 (9.2)	11 (8.3)	24 (8.8)
Both own and parental bed	10 (7.0)	8 (6.0)	18 (6.5)
Twins sharing bed	0 (0.0)	2 (0.7)	2 (0.7)

Infants who usually slept in their own bed in the parent's room comprised 39%.

Overall, there were 44 (16%) infants who co-slept for 2 or more hours, and of these, three infants slept in a bed with a mother who smoked.

Six percent of Europeans usually co-slept for 2 or more hours, compared with 21% of Māori, 35% of “other” ethnicities, and 39% of Pacific infants ( $p < 0.001$ ).

When asked *How long did baby share a bed?* 77 mothers (28%) responded, although only 49 mothers had reported the infant sleeping in a shared bed in the previous question regarding what bed the baby slept in last night. Most of the extra 24 mothers who reported bed sharing in this question shared for less than 2 hours (Table 4). For the 77 mothers overall, 43% shared for less than 2 hours, 17% for 2 to 5 hours, and 40% for more than 5 hours.

**Table 4. Bed-sharing times reported by co-sleeping mothers versus those who reported no co-sleeping**

How long bed was shared	Mothers reporting co-sleeping last night n (%)	Mothers reporting no co-sleeping last night n (%)
<2 hours	9 (18.4)	24 (85.7)
2–5 hours	9 (18.4)	4 (14.3)
>5 hours	31 (63.3)	0 (0.0)
<b>Total</b>	<b>49</b>	<b>28</b>

Mothers whose infants shared the bed for less than 2 hours most commonly gave the reason that it was for short naps or settling baby (59%), or for breastfeeding (21%). Where the bed was shared for more than 5 hours, the reasons stated were: prefer closeness (23%), baby sleeps better (20%), convenience (16%), only bed available (9%), breastfeeding (7%), and other (2%). Seventeen mothers in this group stated they had no concerns about the practice, and 10 had safety or other concerns.

**Room sharing**—A significantly greater number of younger than older infants usually slept in the parent’s room (Table 5). Overall, 54% usually slept in the same room as the parents, while 46% slept in their own room or other room. Responses for “last night” and “usually” in this section were almost identical. Reasons for the choice of room were convenience, parental decision, and ease in observing the infant (each 26%), followed by better sleep (21%), room arrangement (11%), and prefer closeness (10%). Twelve parents (4.3%) said it was the only room available.

**Table 5. What room does baby sleep in?**

Last night	6–8 weeks; n (%)	3–4 months; n (%)	All infants; n (%)
Exclusively same room as parent/s	89 (62.2)	68 (50.4)	157 (56.5)
Own room /other room	54 (37.8)	67 (49.6)	121 (43.5)
	$\chi^2=3.98, p=0.05, df=1$		
Usually	6–8 weeks; n (%)	3–4 months; n (%)	All infants; n (%)
Exclusively same room as parent/s	86 (60.1)	65 (48.1)	151 (54.3)
Own room /other room	57 (39.9)	70 (51.2)	127 (45.7)
	$\chi^2=4.02, p=0.04, df=1$		

Mothers whose infants did not room-share with them cited parental decision (without stating reasons) and better sleep as the main reasons for placing the infant in a separate room. Most mothers (89%) had no concerns about their room arrangements. The remainder expressed concerns about parental sleep quality, safety and other concerns.

**Other comments**—19 mothers (7%) made a comment in the general comments question at the end of the paper that they felt mothers need more information about safe child care practices.

## Discussion

A high percentage (84%) of the mothers cited supine sleep position in their list of SIDS risk factors, and this was borne out by the high prevalence of supine sleeping in their infants. A similar survey in New Zealand in 1992<sup>7</sup> showed that 60% of mothers knew the prone sleep position was a risk factor, although that figure rose to 95% on prompting.

In a survey of Pacific Island families in 2000, 53% of mothers knew of the risk of prone positioning, although 39% were unable to accurately cite a single risk factor.<sup>8</sup>

In this study, although many mothers cited prone sleep position and smoking as risk factors, far fewer were able to cite not bed-sharing, breastfeeding, and keeping the face clear as protective against SIDS. Some mothers were able to cite SIDS prevention messages that are promoted in the United Kingdom (UK) and United States but are not part of the New Zealand programme.

Few mothers incorrectly reported prevention factors. Women who could not report any risk factors were more likely to be first-time mothers, those of ethnicities other than European, and those who reported they had not received a pamphlet concerning SIDS prevention, thus pointing to areas that may need focusing on in order to increase SIDS knowledge among mothers.

Rates of smoking in pregnancy and post-partum in this survey, at around 7%, are noticeably lower than those detailed in other studies which have reported rates of 21% to 31%,<sup>2,7,9-11</sup> although these were matched by our significantly higher rates in Māori and Pacific mothers. Overall, the smoking rate was less than a third of the rate of 24% for New Zealand females aged 15+ years reported in 2004.<sup>12</sup> Additionally, breastfeeding rates, at 97%, are very high in this group of mothers, thus suggesting that education about these two factors (smoking and breastfeeding) may have met with considerable success in these New Zealand mothers.

Thirty-one percent of mothers usually used a pacifier for their infants, a rate similar to the 32% seen in the Auckland control group of the NZCDS<sup>10,13</sup> and the 37% in a later study of pacifier use in 2–3 month-old Auckland infants in 1996.<sup>14,15</sup> Reported UK, European, and Canadian rates are much higher, at 50% to 66%.<sup>16-22</sup>

Concerns expressed about pacifiers in this survey were similar to those previously reported,<sup>23</sup> i.e. dependency and hygiene, however the main reasons were that the mothers felt the infant did not need a dummy or would not take one.

Although some studies have found that pacifiers are protective against SIDS, conflicting results from other studies suggest that this question is still open to debate in the light of potential disadvantages such as interference with the establishment of breastfeeding and a higher risk of otitis media, thus leading to the advice that it may now be inappropriate to discourage the use of pacifiers.<sup>22,24</sup>

Our respondents appeared to differentiate between *sleeping* in a parent's bed and *sharing* a parent's bed. Sharing for many did not necessarily mean sleeping with a parent or other, and was seen as a time for breastfeeding, settling, or short naps. Indeed, bed sharing appears to be a highly variable practice. Sixteen percent of infants in this survey usually slept in a shared bed for some or all of the night, a higher percentage than the 11% in the control group of the NZ Cot Death Study.<sup>10</sup>

Other reported New Zealand rates of bed sharing are 13%<sup>2,25</sup> and 17%,<sup>26</sup> with a much higher rate of 55% being seen in Pacific families in 2000.<sup>27</sup> Variable rates of bed sharing have been reported overseas; in the UK, 11% to 12%,<sup>28,29</sup> and higher rates of 29% to 47% have also been reported.<sup>30,31</sup>

Unpublished data suggests that 45% of Australian infants bed share, with 25% of those infants bed sharing with a mother who smoked (personal communication, Dr Jeanine Young, 2005). Consistent terminology to define what constitutes bed sharing and co-sleeping is needed, as the variations in rates seen may be a product of widely varying definitions and how the practice is perceived by the parents.

The main reasons mothers in this survey gave for bed sharing (i.e. they prefer the closeness, better sleep, and convenience) need to be considered. These benefits can largely be achieved by placing the infant's bed beside the mother's bed, thus reducing the risk of SIDS. The fact that four mothers said that there was no other bed available is concerning.

The protective benefits of room-sharing in the first months of life were not well-known or practised in this group of mothers. The prevalence of infants who room-shared, at 54%, was slightly less than the 61% seen in the controls in the New Zealand Cot Death Study,<sup>32</sup> but higher than the 45% seen in Ford's study of Canterbury infants in 1997.<sup>25</sup>

Studies from both the UK<sup>28</sup> and Europe<sup>19</sup> also show higher rates of room-sharing in their control groups. Importantly, however, it must be remembered that studies reporting room-sharing may also include those infants who are also bed-sharing.

In this survey, only 39% of infants were both sleeping in their own bed and sleeping in the parent's room, strategies that have been shown to be protective for infants in this very young age group.<sup>4,19,32,33</sup>

This study is limited by its response rate of 70%; nevertheless, for a postal-replied survey, this is relatively good. However, current infant care practices in Māori, Pacific, and other ethnicities may not be fully represented.

There is also the possibility that in a written questionnaire some questions may not be understood, and this method may be more limiting than a face to face or telephone interview. It is also possible that the dual aim of the survey, namely to gather information on both knowledge and practices, may inhibit families from providing accurate data due to a sense of guilt.

In conclusion, prone sleep position and smoking were well known as SIDS risk factors in the group of mothers of very young infants studied. The low rate of smoking and high breastfeeding rates among the mothers were particularly encouraging. Other SIDS protective factors such as not bed sharing when asleep and keeping the face clear were not well-known however.

These messages need to be disseminated to parents, particularly to first-time parents and those who may have English language difficulties. Importantly, more babies should be sleeping in their own bed in a parent's room to decrease SIDS risk, and there needs to be discussion with parents about ways to achieve this while at the same time maintaining closeness to the infant and convenience for breastfeeding.

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**Author information:** B Lynne Hutchison, Research Fellow, Department of Paediatrics; Alistair W Stewart, Statistician, School of Population Health; Ed A Mitchell, Professor of Child Health, Department of Paediatrics; The University of Auckland, Auckland

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**Correspondence:** Dr Lynne Hutchison, Department of Paediatrics, The University of Auckland, Private Bag 92019, Auckland. Fax: (09) 373 7486; email: [bl.hutchison@auckland.ac.nz](mailto:bl.hutchison@auckland.ac.nz)

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