

## Addendum to Clinical guideline 37, Postnatal Care

Routine postnatal care of women and their  
babies

*Clinical Guideline Addendum 37.1*

*Methods, evidence and recommendations*

*July 2014*



**Disclaimer**

Healthcare professionals are expected to take NICE clinical guidelines fully into account when exercising their clinical judgement. However, the guidance does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each patient, in consultation with the patient and/or their guardian or carer.

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# Clinical Guidelines Update

The NICE Clinical Guidelines Update Team update discrete parts of published clinical guidelines as requested by NICE's Guidance Executive.

Suitable topics for update are identified through the new surveillance programme (see [surveillance programme interim guide](#)).

These guidelines are updated using a standing Committee of healthcare professionals and lay members from a range of disciplines and localities. For the duration of the update the core members of the Committee are joined by up to 5 additional members who have specific expertise in the topic being updated, hereafter referred to as 'topic-specific members'.

In this document where 'the Committee' is referred to, this means the entire Committee, both the core standing members and topic-specific members.

Where 'standing Committee members' is referred to, this means the core standing members of the Committee only.

Where 'topic-specific members' is referred to this means the recruited group of members with topic specific expertise.

All of the standing members and the topic-specific members are fully voting members of the Committee.

Details of the Committee membership and the NICE team can be found in appendix A. The Committee members' declarations of interest can be found in appendix B.

This update replaces recommendations 1.4.47, 1.4.48 and 1.4.49 in the original post natal care clinical guideline (CG37). Recommendation 1.4.47 cross referred to a Department of Health policy that is no longer available.

# 1 Summary section

## 1.1 Update information

In 2013 new information on the association between co-sleeping and sudden infant death syndrome (SIDS) was published. In view of this NICE received a referral from the Department of Health requesting that a surveillance review be carried out in this area. An exceptional surveillance review took place in 2013 and concluded that the section of Postnatal care: routine postnatal care of women and their babies (NICE clinical guideline 37) on reducing the risk of SIDS should be updated.

New recommendations relating to SIDS have been made in this addendum. You are invited to comment on these new recommendations.

Some recommendations can be made with more certainty than others. The wording used in the recommendations in this addendum denotes the certainty with which the recommendation is made (the strength of the recommendation).

For all recommendations, NICE expects that there is discussion with the person about the risks and benefits of the interventions, and their values and preferences. This discussion aims to help them to reach a fully informed decision (see also 'Person-centred care').

### **Recommendations that must (or must not) be followed**

We usually use 'must' or 'must not' only if there is a legal duty to apply the recommendation. Occasionally we use 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

### **Recommendations that should (or should not) be followed– a 'strong' recommendation**

We use 'offer' (and similar words such as 'refer' or 'advise') when we are confident that, for the vast majority of people, following a recommendation will do more good than harm, and be cost effective. We use similar forms of words (for example, 'Do not offer...') when we are confident that actions will not be of benefit for most people.

### **Recommendations that could be followed**

We use 'consider' when we are confident that following a recommendation will do more good than harm for most people, and be cost effective, but other options may be similarly cost effective. The course of action is more likely to depend on the person's values and preferences than for a strong recommendation, and so the healthcare professional should spend more time considering and discussing the options with the person.

## 1.2 Recommendations

**The cause of sudden infant death syndrome (SIDS) is not known. It may be that there are many factors contributing to SIDS. There are some factors which are known to make SIDS more likely such as placing a baby on their front or side. We need clear evidence to say that a factor directly causes SIDS. This update reviewed evidence relating to co-sleeping (parents or carers sharing a bed or sofa or chair with an infant) in the first year of an infant's life. Some of the reviewed evidence showed that there is a statistical relationship between co-**

**sleeping and SIDS. This means that, where co-sleeping occurs there may be an increase in the number of cases of SIDS. However, the evidence does not allow us to say that co-sleeping causes SIDS. Therefore the term ‘association’ has been used in the recommendations in this update to describe the relationship between co-sleeping and SIDS.**

- 1. Inform parents and carers of the association between sudden infant death syndrome and co-sleeping (parents or carers sharing a bed or sofa or chair with an infant).**
- 2. Acknowledge that co-sleeping (parents or carers sharing a bed or sofa or chair with an infant) occurs.**
- 3. Inform parents and carers that the association between co-sleeping (sharing a bed or sofa or chair with an infant) and sudden infant death syndrome is likely to be greater when they, or their partner, smoke.**
- 4. Inform parents and carers that the association between co-sleeping (sharing a bed or sofa or chair with an infant) and sudden infant death syndrome may be greater with parental or carer drug use and/or recent alcohol consumption.**
- 5. Inform parents and carers that the association between co-sleeping (sharing a bed or sofa or chair with an infant) and sudden infant death syndrome may be greater with low birth weight or premature infants.**

### 1.3 Person-centred care

Patients and healthcare professionals have rights and responsibilities as set out in the [NHS Constitution for England](#) – all NICE guidance is written to reflect these. Treatment and care should take into account individual needs and preferences. People should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If someone does not have the capacity to make decisions, healthcare professionals should follow the [Department of Health’s advice on consent](#), the code of practice that accompanies the [Mental Capacity Act](#) and the supplementary [code of practice on deprivation of liberty safeguards](#). In Wales, healthcare professionals should follow advice on consent from the Welsh Government.

NICE has produced guidance on the components of good patient experience in adult NHS services. All healthcare professionals should follow the recommendations in [Patient experience in adult NHS services](#).

### 1.4 Methods

This update was developed based on the process and methods described in the guideline manual 2012. Where there are deviations from the process and methods, these are clearly stated in the interim process and methods guide for updates pilot programme 2013. This update uses a modified GRADE approach to quality assessment as described in section 2. This guideline update considered a review question on co-sleeping and sudden infant death

syndrome, which has no health economic implications. Therefore a health economic search in this area was not conducted.

Please see the [interim process and methods guide](#) for updates pilot programme 2013 and the [guidelines manual 2012](#).

## 2 Evidence review and recommendations

### Introduction

The exceptional surveillance review process concluded that there was potentially new evidence considering the association between co-sleeping and sudden infant death syndrome (SIDS) and that this warranted an update. The NICE guideline on postnatal care included the section on 'Reducing the risks of SIDS'. This update is an addendum to the guideline on postnatal care.

### 2.1 Review question 1

#### 2.1.1 Review question

What is the risk of co-sleeping in relation to sudden infant death syndrome (SIDS)?

#### 2.1.2 Evidence review

This update considers sudden infant death syndrome (SIDS) a serious, rare and unpredictable event. Therefore it was anticipated that any evidence that would be available for inclusion in this review would involve retrospective data collection. All of the studies that met the inclusion criteria for this review were retrospective case-control studies or analyses that combined data from such studies.

There are discrepancies in the published literature relating to SIDS regarding what is meant by co-sleeping. The definition used in this review is:

- Co-sleeping - includes the sharing of a bed or other sleep surface such as a sofa or a chair

Studies that considered bed-sharing and SIDS were also included. Bed-sharing can be seen as a subset of the co-sleeping group. As with co-sleeping there are differences in how this is defined in different included studies. The definition used in this review is:

- Bed-sharing - the sharing of a bed only

There were 11 individual studies (reported in 12 included papers) and 1 individual patient data meta-analysis of data taken from 5 case-control studies included in the review. Table 2 details the different descriptions used in the studies when the terms co-sleeping and/or bed-sharing were used (several of the included studies did not define what they meant by the terminology they used).

The evidence reviewed in the [original postnatal care guideline](#) was for the first 6-8 weeks after birth. SIDS can occur beyond this and in consultation with clinicians it was decided to extend the remit of this update to infants from birth up to 1 year. The original postnatal care guideline was for the first 6-8 weeks after birth and the terms 'baby/babies' were used throughout. This update is from birth to 1 year so the term 'infant/s' has been used in this addendum.

Table 2 also details the criteria used by the studies to classify cases as SIDS. There is some variety in the methods used between the included studies.

#### 2.1.2.1 Modified GRADE

The Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to quality assessment has been designed principally for use with intervention and diagnostic studies. Consequently it is not directly applicable to case-control studies. It should

be noted that for this review question, with the primary outcome of sudden infant death, that case-control is considered to be the appropriate methodology for the studies in this area.

A modified form of GRADE has been developed for use with non-intervention studies and this has been used to assess the studies included in this review. When GRADE is used for intervention reviews, observational studies (such as case-control) are initially automatically graded as 'low'. Using modified GRADE, where case-control study is considered to be an appropriate design for the question asked, this study design starts the GRADE assessment process as 'high'.

The modified GRADE criteria were adapted from Hayden et al (2006) checklist for prognostic study (NICE Guideline Manual, 2012).

**Table 1: Modified GRADE criteria**

GRADE category	GRADE criteria	Downgrading
Risk of bias	Prospective study Important potential confounders are appropriately accounted for, limiting potential for bias with respect to the factor of interest	Downgrade 1 or 2 levels if either or both were not satisfied
Indirectness	Study sample represents the population of interest with regard to key characteristics, sufficient to limit potential bias to the results The prognostic factor of interest is adequately measured in study participants, sufficient to limit potential bias The outcome of interest is adequately measured in study participants, sufficient to limit potential bias	Downgrade 1 level if any of these were not satisfied Downgrade 2 levels if more than 2 criteria were not satisfied
Inconsistency	Same direction of effect estimates across all studies Overlaps of 95%CI	N/A to a single study Downgrade 1 level if either or both were not satisfied
Imprecision	The statistical analysis is appropriate for the design of the study, limiting potential for the presentation of invalid results (i.e. multivariate analysis – logistic regression model, with consideration of assumption of normality, model diagnostics)	Downgrade 1 level if any of this was not satisfied
Other considerations	Any topic specific additional considerations for this review included assumptions made on interactions	Downgrade 1 level

### 2.1.2.2 Case-control studies used in this post-natal care update – overall study design factors

The modified GRADE criteria described in table 1 and section 2.1.2.1 were used to assess the quality of included evidence (GRADE tables below in section 2.1.2.5).

There are overall study design and analysis issues that applied to the case-control studies used within this review.

Case-control studies are at particular risk of participant selection bias. This applies both to the cases and controls in the studies. Inadequate or inappropriate matching of controls can compound this selection bias.

Within the case-control studies included in this review, the infants had some matching criteria applied (such as age and gender). In most of the included studies there were no such criteria applied to the parents or carers that these infants may be co-sleeping with. As the parent or carer, and infant were co-sleeping it cannot be assumed that all factors within these studies that may have influenced the occurrence of SIDS were related to the infant only. Therefore additional matching relating to parental factors would have added robustness to the study design and analysis. This means that in most of the included studies, potential parental factors, such as Body Mass Index (BMI), socio-economic factors, or parental health factors were not matched for.

Case-control studies are retrospective and will be at risk of bias to potential recall errors of participants, either unintentionally or where they may give a response that they perceive that the researcher seeks, or that they consider will be acceptable.

Comparison between studies was difficult as there were a variety of definitions of both co-sleeping and bed-sharing as described above. Similarly, although logistic regression was used as the analysis method by the included studies, there was varying detail on the analysis methods reported in the included studies. In many of the studies reporting on the analysis used was not detailed. Furthermore, the multivariate analysis often included a variety of factors (adjusted for differing other possible confounding factors) meaning that it was not possible to do any direct comparison of the study outcomes.

Only the multivariate analysis outcomes were used to devise the evidence statements and formed the basis of the Committee's discussion of the evidence for the drafting of recommendations (univariate analysis outcomes that have not been adjusted for possible confounders were not used as evidence as the associations between factors and SIDS could not be confidently established due to the moderating and mediating effects in the regression models [Baron and Kenny, 1986]) (please see the Glossary for the definitions of mediating and moderating effects).

These case-control studies mainly involved interviews (or questionnaire based interviews) with the parents of infants in case and control groups. However, the reporting of who undertook these interviews was limited. Furthermore, details were not reported on the development or validation of the interview (or questionnaire) tools.

An individual patient data meta-analysis of case-control studies was included (Carpenter 2013). This incorporated 5 studies that were included in the case-control evidence review. This combination of individual level patient data is an appropriate approach to the pooling of individual patient data of case-control studies. In combining the data from the individual patients from several studies it allows for the running of a further multivariate regression using a larger sample size. This type of individual patient data analysis is generally considered to provide more precise estimates due to the larger sample size. Studies that combined outcome data from case-control studies but did not use individual patient level data were excluded. They were excluded due to concerns about the methodology as they combined outcome data from studies that included different factors in their analysis.

### **2.1.2.3 Methodological issues**

As all of the included studies are observational rather than controlled experimental, any observed association (or relationship) between a factor and an outcome could be due to a number of possible explanations, for example, chance (random error), bias (systematic error). All these possible explanations need to be considered before inferring the existence of a cause-effect relationship. Therefore, an observed statistical association between a factor (or multiple factors) and an outcome does not necessarily lead us to infer a causal

relationship (Hill, 1965). For further information about the cause and effect relationship see the Bradford-Hill criteria (Hill, 1965).

Due to the various methodological and study design issues of the included studies in this update mentioned above, the evidence base could only illustrate associations and a cause-effect relationship could not be inferred. Therefore, throughout this update, the term association, noting a statistical relationship, was used when discussing the evidence and making recommendations in order to reflect the nature of the evidence. The term risk was avoided as it implies a cause-effect relationship, which could not be inferred from the available evidence base.

#### **2.1.2.4 Risk and association**

The Addendum used the following definitions in this update:

**Risk:**

The probability that an event will occur (e.g., that a person will be affected by, or die from, an illness, injury, or other health condition within a specified time or age span). The term risk somehow infers a cause and effect relationship (causality) (Kirkwood and Stern, 2006).

**Association:**

Any observed relationship (statistical relationship) between a factor and an outcome, which does not necessarily infer a cause and effect relationship (causality) (Hill, 1965).

When considering SIDS and co-sleeping it would be inappropriate to use the term risk as the causes of SIDS are likely to be multi-factorial and a possible causality link with co-sleeping is not clearly established. The term association is used throughout this guideline update. This denotes where there is a statistical relationship between SIDS and co-sleeping while acknowledging that it cannot be definitively stated that co-sleeping is a risk for SIDS.

## 2.1.2.5 Summary of included studies

**Table 2: Summary of included studies**

Reference	Descriptions of co-sleeping and/or bed-sharing criteria used in the study (if reported)	Results reported for	How cases classified as SIDS		Outcomes
			Matching	Time to interview	
Blair (1999) UK	Bed-sharer was classed as those who shared the same sleeping place (bed or sofa) with at least 1 parent for any part of the reference sleep (co-sleeping by the definition used in this review)	Co-sleeping; sharing of a sofa or chair Co-sleeping; bed-sharing	Cause of death established by a multidisciplinary committee, following full necropsy Controls born in the 2weeks before or after the case Cases contacted within days of death for a narrative account (within 2weeks for questionnaire completion)		Bed sharer (at the end of sleep); cases 82 (25.5%), controls 189 (14.5%), multivariate OR 9.78 (95%CI; 4.02 to 23.83) Sofa sharer; cases (20 (6.2%)), controls (6 (0.5%)), multivariate OR 48.99 (95%CI; 5.04 to 475.60)
Blair (2006) UK	Co-sleeping; in the parental bed or found co-sleeping on a sofa or chair with at least 1 parent  (Reports additional outcomes from the Blair (1999) study)	Co-sleeping; sharing of a bed or sofa or chair	Cause of death established by a multidisciplinary committee, following full necropsy Controls born in the 2weeks before or after the case Cases contacted within days of death for a narrative account (within 2weeks for questionnaire completion)		Small at birth, co-sleeping (smoke); cases 24(7.5%), controls 8(0.6%), multivariate OR 37.41 (95%CI, 5.83 to 239.86) Small at birth, co-sleeping(don't smoke); cases 2(0.6%), controls 7(0.5%), multivariate OR 15.18 (95%CI, 1.02 to 225.86)
Blair (2009) UK	Co-sleeping; an infant sharing the same bed or sofa with an adult or child (combined these into a single co-sleeping group)	Co-sleeping; sharing of a bed or sofa or chair	Cause of death established at a multidisciplinary review meeting Random controls matched for age and time of day case death had occurred (for the reference sleep data) High-risk controls matched for maternal smoking, larger families, younger mothers, mother's social class Cases contacted as soon as possible after the death for a narrative account (2weeks later questionnaire completion)		Co-sleeping; cases 43 (54%), controls 18 (21%), multivariate OR 21.77 (3.79 to 125.00)
Brooke (1997)	Classed as routinely	Unsure	Deaths classified using standard necropsy protocol, all death certificates of those 1week to 1year considered		Routinely sleeps with parents; cases 11 (8%), controls 6 (2%),

Reference	Descriptions of co-sleeping and/or bed-sharing criteria used in the study (if reported)	Results reported for	How cases classified as SIDS	
			Matching	Outcomes
			Time to interview	
UK	sleeps with parents (no further details reported)		for possible misclassification of explained deaths	multivariate OR 2.90 (0.75 to 11.26)
			Matched for age, season and maternity unit	
			Cases visited within 21 days of death	
Carpenter (2004)	Bed-sharing; all-night bed-sharing with an adult	Co-sleeping; bed-sharing	Cases of SIDS by pathology conferences to ensure agreement on the interpretation of post-mortem findings	Mother non-smoker, did bed-share; cases 32 (4.5%), controls 139 (5.8%), multivariate OR 1.56 (0.91 to 2.68)
UK			Matched for age and living in the same survey area at the time	
			Median time from death to interview 15 days	
Hauck (2003)	Bed-sharing defined as an infant sleeping with ≥1 people on the same sleep surface, such as a mattress or sofa	Co-sleeping; sharing of a bed or sofa or chair	Death remains unexplained after case investigation, complete autopsy, examination of death scene and review of clinical history	Sofa/chair; cases 26 (10%), controls 14 (5.4%), adjusted OR 1.6 (0.7 to 3.7)
USA			Matched for maternal race/ethnicity, age, birth weight	
			Cases, initial case investigation, interview 2 weeks after death	
Klonoff-Cohen (1995)	Bed-sharing; routinely sharing a bed with mother, father or other relative, or babysitter, during the day or night	Co-sleeping; bed-sharing	Obtained from death certificates, had had autopsy	Bed-sharing (day); adjusted OR 1.38 (0.59 to 3.22)
USA			Matched for birth hospital, date of birth, sex, race	
			Cases, contacted for interview 6-12 months after death	
McGarvey (2006)	Co-sleeping; during last sleep, any shared sleeping arrangement of infant with adult in or on a bed/sofa/armchair Bed-sharing; infants sharing an adult bed with ≥1 adult	Co-sleeping; sharing of a bed or sofa or chair	SIDS diagnosis accepted where that had been used on the death certificate	Bed-sharing; cases 128 (49%), controls 101 (12%), multivariate OR 3.53 (1.40 to 8.93). interaction with mother smoker, adjusted OR 6.35 (1.15 to 34.81)
Ireland			Matched for date of birth, community care areas	
			Cases, contacted for interview within 6 weeks of infant death	

Reference	Descriptions of co-sleeping and/or bed-sharing criteria used in the study (if reported)	Results reported for	How cases classified as SIDS	Outcomes
			Matching	
			Time to interview	
Mitchell (1997)  NZ	Not reported	Co-sleeping; bed-sharing	Deaths registered by the NZ Health Information Service as attributable to SIDS in the post neonatal age group Autopsy was not an essential part of the definition (98%, i.e. almost all deaths classed as SIDS have had an autopsy)	Bed-sharing and maternal non-n smoking; cases 4 (6.8%), controls 61 (8.0%), adjusted OR 1.03 (0.21 to 5.06)  Bed-sharing and maternal smoking; cases 10 (16.9%), controls 25 (3.3%), adjusted OR 5.02 (1.05 to 24.05)
			Had same data recorded by the community child health nurses as the cases	
			Data for cases transcribed from nursing records, from routinely recorded data on every infant	
Ruys (2007) The Netherlands	Bed-sharing (cases); found dead co-sleeping with one or both parents Bed-sharing (controls); bed-sharing in the previous night for at least part of the night Co-sleeping on a sofa or chair excluded	Co-sleeping; bed-sharing	SIDS as defined by the Cot Death Committee of the Dutch Paediatric Association Matched for age	Bed-sharing, adjusted for breast-feeding, 3mths, OR 2.1 (1.1 to 4.2), 4-5mths 0.9 (0.3 to 2.7)
			Cases, interviewed within weeks or sometimes months after death	
Tappin (2005)  UK	Bed-sharing; infants who spent most of the last sleep in room with parents and bed-shared for some/all of last sleep	Co-sleeping; sharing of a sofa/chair	Pathologist notification of all unexplained infant death. Standard necropsy protocol, with agreed diagnostic criteria to provide consistent classification (94% of cases examined by an expert paediatric pathologist)	Bed-sharing; cases 46 (37%), controls 44 (17%), multivariate OR 3.49 (1.54 to 7.92)  Sofa; cases 14 (11%), controls 2 (1%), multivariate OR 66.95 (2.81 to 1596)
		Co-sleeping; bed-sharing	Controls were the births immediately before and after in the same maternity unit Cases, interviewed within 28days of death	
Vennemann (2009)  Germany	Bed-sharing; parental bed (did not use the term bed-sharing) Co-sleeping; sofa (did not use the term co-sleeping)	Co-sleeping; sharing of a sofa	All cases autopsied by forensic pathologists using a standardised protocol including histology, microbiology, virology, toxicology, and neuropathology. Multidisciplinary panel decided whether the case was SIDS or an explained case of sudden death in infancy	Bed-sharing; cases 48 (14.4%), controls 89 (8.9%), multivariate OR 2.73 (1.34 to 5.55)  Sofa; cases 14 (4.2%), controls 13. (1.3%), multivariate OR 3.69
		Co-sleeping; bed-sharing	Matched for age, gender, religion, sleep time	

Reference	Descriptions of co-sleeping and/or bed-sharing criteria used in the study (if reported)	Results reported for	How cases classified as SIDS		Outcomes (0.86 to 15.84)
			Matching	Time to interview	
			Unclear		

### 2.1.2.6 GRADE tables

**Table 3: GRADE profile, individual patient data analysis**

Reference	Design	Risk of bias	Indirectness	Inconsistency	Imprecision	Other considerations	Quality
Carpenter (2013)	Individual patient data analysis of case-control studies	Serious <sup>1</sup>	Serious <sup>2</sup>	Serious <sup>3</sup>	Serious <sup>4</sup>	Serious <sup>5</sup>	Very low

1. Combination of patient data from studies with different baseline criteria including different criteria used for bed-sharing (downgraded 1 level)
2. Cases and controls co-sleeping on a sofa or elsewhere were grouped with those not bed-sharing and not sleeping in the parents' room (downgrade 1 level)
3. Combined individual level data from several studies, no selection criteria given for studies selected (downgraded 1 level)
4. Considerable missing data for some analysis factors, (downgraded 1 level)
5. Assumptions made that there were no interactions between various OR

**Table 4: GRADE profiles, case-control studies**

Reference	Design	Risk of bias	Indirectness	Inconsistency	Imprecision	Other considerations	Quality
Blair (1999)	Case-control	Very serious <sup>6</sup>	No serious	N/A	Very serious <sup>8</sup>	N/A	Very low
Blair (2006)	Case-control	Very serious <sup>6</sup>	No serious	N/A	Very serious <sup>8</sup>	N/A	Very low
Blair (2009)	Case-control	Very serious <sup>6</sup>	No serious	N/A	Very serious <sup>8</sup>	N/A	Very low
Brooke (1997)	Case-control	Very serious <sup>6,7</sup>	No serious	N/A	Serious <sup>9</sup>	N/A	Very low
Carpenter (2004)	Case-control	Very serious <sup>6,7</sup>	No serious	N/A	Very serious <sup>9,12</sup>	N/A	Very low
Hauck (2003)	Case-control	Very serious <sup>6,7</sup>	No serious	N/A	Serious <sup>9</sup>	N/A	Very low

Reference	Design	Risk of bias	Indirectness	Inconsistency	Imprecision	Other considerations	Quality
Klonoff-Cohen (1995)	Case-control	Very serious <sup>6,7,10,13</sup>	No serious	N/A	Serious <sup>9</sup>	N/A	Very low
McGarvey (2006)	Case-control	Very serious <sup>6,7</sup>	No serious	N/A	Serious <sup>9</sup>	N/A	Very low
Mitchell (1997)	Case-control	Very serious <sup>6,11,12</sup>	No serious	N/A	Serious <sup>9</sup>	N/A	Very low
Ruys (2007)	Case-control	Very serious <sup>6,7,13</sup>	No serious	N/A	No serious	N/A	Very low
Tappin (2005)	Case-control	Very serious <sup>6,7</sup>	No serious	N/A	Very serious <sup>9,12</sup>	N/A	Very low
Venneman (2009)	Case-control	Very serious <sup>6,7</sup>	No serious	N/A	Serious <sup>9</sup>	N/A	Very low

6. Retrospective case-control study, confounders not appropriately controlled for (downgraded 1 level)

7. No details on interview/questionnaire tool development, no or lack of details on interviewer training/background (downgraded 1 level)

8. Analysis used a non-normal distribution, no model goodness-of-fit testing (downgraded 2 levels)

9. Limited analysis detail, no model goodness-of-fit testing (downgraded 1 level)

10. Potential participants contacted >6 months after the case death (downgraded 1 level)

11. Lack of definition of bed-sharing and/or co-sleeping (downgraded 1 level) Unconditional regression used or unclear (downgraded 1 level)

12. Interviews completed weeks or months after death (downgraded 1 level)

### **2.1.3 Evidence statements**

#### **2.1.3.1 Co-sleeping (on a sofa or chair)**

There were 4 studies (very low quality) that reported on the sharing of a sofa or chair. Of these, 2 studies reported a statistically significant increased association with sudden infant death syndrome cases, 1 found no statistically significant association and the other study had an insufficient sample size to draw any conclusions. (The sub samples of those sharing a sofa or chair in all these studies were small).

#### **2.1.3.2 Co-sleeping (on a bed or sofa or chair)**

There were 3 studies (very low quality) that reported on co-sleeping (sharing of a bed/sofa/chair). Of these, 2 reported a statistically significant increased association with sudden infant death syndrome cases. One study considered pre-term and low birth weight infants, and co-sleeping, and found a statistically significant increased association with sudden infant death syndrome cases.

One study (very low quality) reported on co-sleeping (co-sleeping was not defined in this study) found no statistically significant increased association with sudden infant death syndrome cases.

#### **2.1.3.3 Co-sleeping (bed sharing only)**

There was 1 individual patient level data meta-analysis (very low quality) that considered bed-sharing. This analysis included data from 5 of the case-control studies also included in this evidence review. This analysis found bed-sharing to have a statistically significant increased association with sudden infant death syndrome cases.

There were 6 studies (very low quality) that reported on bed-sharing. Of these, 2 reported a statistically increased association with SIDS cases and 3 found no statistically significant association. One study initially found a statistically significant increased association which became non-significant when what were considered to be adverse bed-sharing conditions were included.

#### **2.1.3.4 Other factors considered in relation to the association between co-sleeping and SIDS**

There were 5 studies (very low quality) that reported on bed-sharing and smoking. Of these 2 studies that had found a statistically significant association with bed-sharing and cases of sudden infant death syndrome also found a statistically significant association with bed-sharing and maternal smoking. Two studies that had found no statistically significant association with bed-sharing and cases of sudden infant death syndrome found a statistically significant association with bed-sharing and maternal smoking and cases of sudden infant death syndrome. One study that had found a statistically significant association with bed-sharing and cases of sudden infant death syndrome found no association with bed-sharing and maternal or parental smoking.

The individual patient data meta-analysis (very low quality) considered the interaction<sup>a</sup> between bed-sharing and parental smoking; this found a statistically significant association with these factors and cases of sudden infant death syndrome. This analysis included data from 5 of the case-control studies also included in this evidence review.

For other potential associated factors considered in the included studies (very low quality), such as recent alcohol consumption, drug use, breast-feeding, the evidence was insufficient

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<sup>a</sup> For definition of the term interaction in the context of multivariate regression analysis, please see Glossary.

to report any clear association(s) as the sample sizes used in the analysis of these factors were small.

## 2.1.4 Evidence to recommendations

<p><b>Relative value of different outcomes</b></p>	<p>The sole critical outcome used within the evidence review was the occurrence of sudden infant death syndrome (SIDS).</p> <p>The Committee acknowledged the extended remit of this update beyond the first 6-8 weeks after birth to incorporate evidence for infants up to 1 year. The Committee discussed that the incidence of SIDS is higher in the first few months of life.</p> <p>The Committee noted that while this review considers the association between co-sleeping and SIDS, there are other factors that may be involved in cases of SIDS. Furthermore it may be that there are factors that interact<sup>a</sup> with co-sleeping that may have an effect on any association between co-sleeping and SIDS. The Committee agreed that it is reasonable to view that cases of SIDS may well be multi-factorial with the potential that there may be complex multiple associations among many factors.</p> <p>The Committee discussed that there may be many reasons why co-sleeping occurs such as; promoting and maintaining breast-feeding; cultural and traditional sleeping practices; and/or socio-economic factors, and that these factors may influence where infants sleep. The Committee further discussed that co-sleeping may occur out of necessity, such as for those who do not have an ideal home environment for healthcare. Co-sleeping may occur in either a pre-planned or an unplanned way.</p> <p>The Committee viewed that the potential impact of unknown factors on the occurrence of co-sleeping. This can be exemplified the importance of not making assumptions about the reasons why parents and carers may co-sleep. Consequently the Committee noted the importance of acknowledging and exploring these reasons. Therefore it was agreed that this should be noted within the recommendations.</p>
<p><b>Trade-off between benefits and harms</b></p>	<p>The Committee noted that it is reasonable to consider that the occurrence of SIDS may be multi-factorial, accepting that prone sleeping is a known risk factor. The Committee reiterated that due to the methodological issues with the evidence, when discussing SIDS and co-sleeping, that it cannot be discussed in terms of risk since a cause and effect relationship cannot be inferred. Therefore it can only be discussed in terms of an association. This makes it difficult to be definitive about recommending behavioural changes.</p> <p>The Committee members further discussed the importance of ensuring that, if parents and carers are being asked to consider or alter their behaviour in regard to their sleeping practices in response to an association, then they need to be informed as soon as possible about this, preferably ante-natally. The Committee further discussed that parents and carers may need information relating to co-sleeping and SIDS at several time points, such as before birth, after birth and any other occasion where they have healthcare professional contact.</p> <p>Nonetheless the Committee noted that with such a serious potential outcome it is important for parents and carers to be informed that there is an association between co-sleeping and SIDS. The Committee discussed that the evidence for this association covered all aspects of the agreed definition for co-sleeping, that is, the sharing of a bed or a sofa or a chair. Though it was noted that for the</p>

sharing of a sofa or chair, the results from the included studies were based on small samples.

The Committee had agreed at the beginning of the discussion of the evidence that it is possible many factors may interact<sup>a</sup> with the occurrences of SIDS, but these interactions are unknown. This review only included possible other factors that may be associated with SIDS, where they had been considered along with co-sleeping. For these possible factors that had been considered with co-sleeping and cases of SIDS in some of the included studies, the Committee agreed that there was evidence of an independent association among smoking, co-sleeping and SIDS.

The Committee also discussed the evidence in relation to alcohol and/or illegal drug use where this had been considered alongside co-sleeping and SIDS. They agreed that it was not possible to ascertain an association with these factors due to the small numbers of cases and controls reported in the included studies. Nonetheless, both alcohol and illegal drug use had been included in the original recommendations in the postnatal care guideline and there was very limited evidence in this area included in the evidence review. The Committee discussed and agreed that, while accepting the insufficient evidence in this area, these factors had been included in the original and it was not possible to ascertain that there is not an association with co-sleeping and SIDS. Therefore it was considered inappropriate to exclude these factors from the updated recommendations.

The Committee discussed other factors that had been included in the original recommendations. The committee members considered where the recommendation had included the use of medication of drugs that can make them sleep more heavily. No evidence had been identified in relation to co-sleeping and legal drug use. The committee noted that the terminology used was quite vague and in the absence of any evidence that this would not be included in the updated recommendation. Similarly the committee discussed the inclusion of the term very tired in the original recommendation. It was agreed that this is a very subjective description which probably applies to many parents and carers of infants. It was agreed that this did not help with decisions that parents or carers may make about co-sleeping and would not be included in the updated recommendations.

The topic-specific members raised the concern that within any recommendations made by the Committee, terminology and clarity would be very important. The topic-specific members noted potential confusion that could arise by the use of the term bed-sharing, that this could be taken literally, and that parents and carers may decide to avoid sharing a bed with their infant thinking that sharing of other surfaces such as a sofa or chair may be safer. The Committee further discussed the importance of clear communication where there may be potential communication issues, e.g. where English is not the primary spoken language. Consequently the Committee agreed recommendations that did not separate co-sleeping into the constituent possibilities but defined it in the recommendations to include the sharing of a bed or sofa or chair.

The Committee discussed that any recommendations made in relation to co-sleeping and SIDS may have the potential to impact other aspects of infant care. This was specifically discussed in relation to breastfeeding. As with any other potential factor that may impact on an association between co-sleeping and SIDS (in that it may potentially increase or decrease this association), breastfeeding was only included where it had been considered as an additional factors that interacts<sup>a</sup> with the association between co-sleeping and SIDS. The review questions on breastfeeding in Postnatal care (NICE clinical guideline 37) were not updated in this guideline addendum.

There was very limited evidence found in relation to co-sleeping and

	<p>breastfeeding and SIDS. The Committee acknowledged that the agreed remit for this update is the potential risks of co-sleeping and therefore could not make any further comment with regard to breastfeeding alone.</p> <p>The Committee considered that there is some evidence that the association between co-sleeping and SIDS may be more evident for those of low birth (&lt;2500g) weight, or those born before 37 weeks, though the committee noted that very limited evidence is available in this area. The Committee considered it to be important that parents and carers of these infants were aware of this possible association.</p> <p>The Committee concluded that with the evidence available they could make recommendations in this update. They noted that as this is evidence of an association, the core of these recommendations would be to ensure that parents and carers are as fully informed as possible for any decision-making.</p>
<b>Quality of evidence</b>	<p>The Committee discussed the quality of the evidence presented via the modified GRADE tables and evidence review. The Committee noted that the evidence is generally of lower quality than would preferentially be used to make recommendations. The Committee discussed the limitations of case control evidence noting the retrospective nature of data collection with attendant risks of potential intentional or unintentional recall bias. The need to adjust for possible confounders in the analysis of the outcomes was discussed and agreed by the Committee. Furthermore, the Committee highlighted the rarity and seriousness of SIDS. Consequently, it was concluded that it was important to discuss the evidence in detail and that the seriousness of the outcome merited the use of lower quality evidence.</p> <p>The Committee further discussed the overall challenges of SIDS research; it was agreed that, for this review question related to co-sleeping, the presented case-control based studies represented an appropriate study design to be included in the evidence review.</p>
<b>Trade-off between net health benefits and resource use</b>	<p>There are no resource implications in this guideline update and recommendations.</p>
<b>Other considerations</b>	<p>The Committee noted the need for further research in the possible factors associated with SIDS.</p>

### 2.1.5 Recommendations

**The cause of sudden infant death syndrome (SIDS) is not known. It may be that there are many factors contributing to SIDS. There are some factors which are known to make SIDS more likely such as placing a baby on their front or side. We need clear evidence to say that a factor directly causes SIDS. This update reviewed evidence relating to co-sleeping (parents or carers sharing a bed or sofa or chair with an infant) in the first year of an infant's life. Some of the reviewed evidence showed that there is a statistical relationship between co-sleeping and SIDS. This means that, where co-sleeping occurs there may be an increase in the number of cases of SIDS. However, the evidence does not allow us to say that co-sleeping causes SIDS. Therefore the term 'association' has been used in the recommendations in this update to describe the relationship between co-sleeping and SIDS.**

- 1. Inform parents and carers of the association between sudden infant death syndrome and co-sleeping (parents or carers sharing a bed or sofa or chair with an infant).**
- 2. Acknowledge that co-sleeping (parents or carers sharing a bed or sofa or chair with an infant) occurs.**
- 3. Inform parents and carers that the association between co-sleeping (sharing a bed or sofa or chair with an infant) and sudden infant death syndrome is likely to be greater when they, or their partner, smoke.**
- 4. Inform parents and carers that the association between co-sleeping (sharing a bed or sofa or chair with an infant) and sudden infant death syndrome may be greater with parental or carer drug use and/or recent alcohol consumption.**
- 5. Inform parents and carers that the association between co-sleeping (sharing a bed or sofa or chair with an infant) and sudden infant death syndrome may be greater with low birth weight or premature infants.**

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## 4 Glossary & abbreviations

Please refer to the [NICE glossary](#).

Interaction	In multivariate regression analysis, an <i>interaction</i> occurs when the magnitude of the association (correlation) of one independent variable (a factor) on an outcome varies as a function of a second independent variable (another factor). <i>Interaction</i> is closely linked to moderating effect.
Moderating effect (a moderator)	In multivariate regression analysis, a moderator is a variable that interacts with the factors and the outcome, changing the degree or direction of the association (correlation).
Mediating effect (a mediator)	In multivariate regression analysis, mediating effect is the mechanism or process that underlies an observed association (correlation) between an independent variable (a factor) and a dependent variable (an outcome) via the inclusion of a third explanatory variable (explanatory factor), known as a mediator variable. For example, indirect association of one factor on another (X predicts Y through Z). Often, when a mediator is included in a model for adjustment testing, the association between a factor and an outcome could disappear or weaken (partial mediation).

## 5 Appendices

### Appendix A: Committee members and NICE teams

#### A.1 Standing Committee members

Susan Bewley, SC Chair, Professor of Complex Obstetrics, Kings College London

Gita Bhutani, Clinical Psychologist, Lancashire Care NHS Foundation Trust

Jennifer Bostock, Lay Member

Simon Corbett, Cardiologist, University Hospital Southampton NHS Trust

Gail Fortes Mayer, Commissioner, West Midlands Ambulance Service

John Graham, Consultant Oncologist & Trust Cancer Lead Clinician, Taunton & Somerset Hospital

Peter Hoskin, Consultant in Clinical Oncology, Mount Vernon Hospital

Roberta James, Programme Lead, Scottish Intercollegiate Guidelines Network (SIGN)

Asma Khalil, Obstetrician, St George's Hospital University London

Manoj Mistry, Lay member

Amaka Offiah, Radiologist and Clinical Senior Lecturer, Sheffield University

Mark Rodgers, Research Fellow, University of York

Nicholas Steel, Clinical Senior Lecturer in Primary Care, Norwich Medical School

Sietse Wieringa, General Practitioner, Barts & the London School of Medicine & Dentistry

#### A.2 Topic-specific Committee members

Helen Ball, Lay member

Justin Daniels, Paediatrician, North Middlesex Hospital

Valerie Finigan, Midwife, Pennine Acute NHS Trust

Elaine McInnes, Professional Development Officer, Institute of Health Visiting; Health Visitor, Cambridge Community Trust

Gabrielle Osrin, Lay member

### **A.3 Clinical guidelines update team**

Nicole Elliott, Associate Director

Phil Alderson, Clinical Advisor

Toni Tan, Technical Advisor

Susannah Moon, Programme Manager

Roberta Richey, Technical Analyst

Charlotte Purves, Administrator

Jenny Kendrick, Information specialist

### **A.4 NICE project team**

Sharon Summers-Ma, Guideline Lead

Christine Carson, Clinical Advisor

Judith Thornton, Technical Lead

Ben Doak, Guideline Commissioning Manager

Anne-Louise Clayton, Senior Medical Editor

Jennifer Wells, Guideline Co-ordinator

Barbara Meredith, Public Involvement Advisor

## Appendix B: Declaration of interests

Member name	Interest declared	Date declared	Type of interest	Decision
<b>Standing committee members</b>				
Susan Bewley	<p>Self-employed academic and obstetric expert. 100 hour per annum teaching contract with Kings College London. In the last 12 months received income or fees for:</p> <p>Research projects as a principal or co-investigator or giving expert advice (presently these include projects on major postpartum haemorrhage, the organisation of maternity care, gestation time for abortion)</p> <p>Academic supervision (PhD on implementation of external cephalic version, chair of 35/39 TSC on the timing of induction)</p> <p>Teaching (BSc law and ethics tutor at KCL, occasional fees for lectures on obstetrics)</p> <p>Medico-legal reports (approx 2/year) and Medical Defence Union cases committee and council</p> <p>External reviews for NHS organisations related to my obstetric expertise (serious incident and maternal mortality investigations, RCOG review)</p> <p>Chairing NICE intrapartum care update GDG</p> <p>Expert advice to NHS Quest (development of a maternity 'safety thermometer')</p> <p>Royalties from edited books Advice to Marie Stopes International about obstetric standards</p> <p>Expenses paid to attend conferences to lecture on obstetric topics. In the last year this included speaking to a Human Rights conference at the Hague, the Royal Society of Edinburgh, and the International Society of Psychosomatic Obstetrics and Gynaecology, and attending the British Maternal Fetal Medicine Society conference. Received a community grant to attend the British HIV Association conference.</p>	30/05/2013	Personal pecuniary interest	Declare and participate

Member name	Interest declared	Date declared	Type of interest	Decision
<b>Standing committee members</b>				
	<p>Joint intellectual property rights in a new neonatal resuscitation trolley, but these were negotiated to be handed over to Liverpool University and Inditherm. In return, the inventors have negotiated that a fee generated on the sale of each trolley will be given to charity.</p> <p>Expressed views in publications about obstetric matters, largely based on evidence. A trustee and committee member of Healthwatch (a charity devoted to evidence and "for treatments that work") and a trustee of Sophia (a charity devoted to women with HIV and the UK arm of the Global Coalition for Women and AIDS).</p>		<p>Non-personal pecuniary interest</p> <p>Personal non-pecuniary interest</p>	
Gita Bhutani	None	01/07/2013		No action
Jennifer Bostock	None	01/12/2013		No action
Simon Corbett	None	09/07/2013		No action
Gail Fortes Mayer	None	31/01/2014		No action
John Graham	<p>Director of National Collaborating Centre for Cancer – this post is funded through a contract with NICE to produce NICE's clinical guidelines.</p> <p>Principal investigator for an ongoing clinical trial in prostate cancer with Custirsen funded by OncoGenex Technologies Inc and Teva Pharmaceutical Industries Ltd.</p> <p>Principal investigator for 8 ongoing clinical trials in breast and prostate cancer run via the National Cancer Research Network (not pharmaceutical industry funded)</p> <p>Member of the trial management groups for 2 prostate cancer trials: RT01 and CHHIP. Both are closed to recruitment but continuing to report trial results.</p>	06/12/2013	<p>Non-personal pecuniary interest</p> <p>Personal non-pecuniary interest</p>	Declare and participate
Peter Hoskins	<p>Research grant paid to department from Varian Medical (until Dec 2013)</p> <p>Investigator in research studies sponsored by various companies with payment for expenses to NHS Trust and department which fund research staff. Recent studies have been on</p>	04/06/2013	Non-personal pecuniary interest	Declare and participate

Member name	Interest declared	Date declared	Type of interest	Decision
<b>Standing committee members</b>				
	<p>behalf of Millenium, Astellas, Ipsen and Amgen.</p> <p>Fellow of the Royal College of Radiologists and member of Faculty Board, Specialist Training Board and Chair of Exam Board.</p> <p>Consultant to the IAEA; Undertake by invitation lectures and working group meetings for which expenses may be paid</p> <p>Received reimbursement of travelling expenses and conference registration fee for attending the European Society of Radiation and Oncology (ESTRO) in December 2013</p> <p>Chief investigator for a trial investigating brachytherapy +/- external beam radiotherapy, which received funding from Dept of Health and CRUK. Continues to follow those patients up and publish data from the study.</p> <p>Holds a research grant from Varian which pays the salary for a data manager working of HDR boost, for Brachytherapy in prostate cancer.</p> <p>Department reimbursed for studies on abiraterone by Cougar.</p> <p>Department reimbursed for studies on alpharadin by Astellas.</p> <p>Department reimbursed for studies on MDV 3100 by Medivation.</p> <p>Department reimbursed for studies on Denosumab for prostate cancer. Funded by Amgen.</p> <p>Department receives grants from Astellas for trials in prostate cancer.</p> <p>Department receives grants from Bayer for trails in prostate cancer.</p> <p>Department received grants from Millennium for trials in prostate cancer.</p> <p>Department received grants from Varian for trials in prostate cancer.</p> <p>Trustee for funding research within the unit/department. Funded by Donations/Legacies. No Non-Hodgkin's lymphoma research has</p>		<p>Personal non-pecuniary interest</p> <p>Personal pecuniary interest</p> <p>Non-personal pecuniary interest</p>	

Member name	Interest declared	Date declared	Type of interest	Decision
<b>Standing committee members</b>				
	<p>been funded in the last 12 months.</p> <p>Chair Steering Group for National Cancer Intelligence Network (NCIN)</p> <p>Member of the committee of Medical Aspects for Radiation Exposure (COMARE)</p> <p>Chair of the executive committee of GEC ESTRO Brachytherapy Group.</p> <p>Member of the faculty board of the Royal College of Radiologists.</p> <p>Member of the specialist training committee for the Royal college of Radiologists.</p> <p>Member of the specialist training advisory committee (STAC) for the Royal College of Radiologist.</p> <p>Editorial board member for the Journal of Clinical Oncology</p> <p>Editorial board member for the Journal of Bone Oncology</p> <p>Editorial board member for the Journal of Contemporary Brachytherapy.</p> <p>Member of the East of England senate.</p> <p>Member of the NICE standing committee for rapid updates / and non-Hodgkin's lymphoma GDG.</p>		Personal non pecuniary interest	
Roberta James	Programme Lead at Scottish Intercollegiate Guidelines Network (SIGN)	03/12/2013	Personal non-pecuniary interest	Declare and participate
Asma Khalil	None	05/07/2013		No action
Manoj Mistry	None	24/12/2013		No action
Amaka Offiah	Provision of expert advice to Her Majesty's Courts in cases of suspected child abuse	07/09/2013	Personal Pecuniary interest	Declare and participate
Mark Rodgers	<p>Associate editor of the journal Systematic Reviews that publishes research on health and social care.</p> <p>Research fellow in health services research and have provided independent academic reviews of clinical effectiveness and diagnostic accuracy evidence for funders including NIHR and NICE.</p>	21/05/2014	Personal non-pecuniary interest	Declare and participate

Member name	Interest declared	Date declared	Type of interest	Decision
<b>Standing committee members</b>				
Nicholas Steel	Currently finishing work as the principal investigator on a National Institute of Health Research (NIHR) funded project on: 'Are NICE clinical guidelines for primary care based on evidence from primary care?'	31/12/2013		Declare and participate
Sietsa Wieringa	None	24/12/2013		No action
<b>Topic-specific committee members</b>				
Helen Ball	<p>Research lab has received research grants from SIDS Charities (FSID, Scottish Cot Death Trust, Babes in Arms) to conduct research regarding SIDS and bed sharing. The University has received consultancy funding from NHS Trusts, the Kindred Agency, and TAMBA (Twin and Multiple Birth Association) for infant sleep related projects that my team and I have conducted.</p> <p>My personal experience of bed-sharing with my infants led to my research interest in why and how UK mothers bed share, the pros and cons of bed sharing under different circumstances, and the cultural variations in bed sharing within the UK. I have published academic articles on this topic and spoken at conferences. I have been invited to contribute to various committees producing SIDS guidance relating to bed sharing (e.g. Dept of Health, Scottish Executive, UNICEF, NHS Trusts, RCM).</p>	12/03/2014	<p>Non-personal pecuniary interest</p> <p>Personal non-pecuniary interest</p>	Declare and participate
Justin Daniels	None	11/03/2014		No action
Valerie Finigan	I have written the Trust's guideline on safe bed sharing and I have worked as a member of the UNICEF designation Committee for the last 3 years (term has ended) Where I have contributed comments on the draft of the leaflet 'Caring for babies at night'	04/03/2014	Personal non-pecuniary interest	Declare and participate
Elaine McInnes	None	28/04/2014		No action
Gabrielle Osrin	None	12/03/2014		No action

## Appendix C: Review protocol

	Details
<b>Review question</b>	What is the risk of co-sleeping in relation to sudden infant death syndrome (SIDS)?
<b>Review questions – previous guideline</b>	<p>CG37 postnatal care included a section on safety that considered SIDS</p> <p>Below are the review questions that were considered in CG37; What reduces/eliminates the risk of death among infants in the first 6-8 weeks? What are the risks of co-sleeping?</p> <p>Current guideline recommends; Parents should be given information in line with the Department of Health guidance about sudden infant death syndrome (SIDS) and co-sleeping (Reduce the risk of cot death, November 2005) which states that “The safest place for your baby to sleep is in a cot in your room for the first six months. While it’s lovely to have your baby with you for a cuddle or a feed, it’s safest to put your baby back in their cot before you go to sleep. There is also a risk that you might rollover in your sleep and suffocate your baby, or that your baby could get caught between the wall and the bed, or could roll out of an adult bed and get injured”.</p> <p>Parents should be advised never to sleep on a sofa or armchair with their babies.</p> <p>If parents choose to share a bed with their infant, they should be advised that there is an increased risk of SIDS, especially when the baby is less than 11 weeks old, if either parent:</p> <ul style="list-style-type: none"> <li>- is a smoker</li> <li>- has recently drunk alcohol</li> <li>- has taken medication or drugs that make them sleep more heavily</li> <li>- is very tired</li> </ul>
<b>Type of review</b>	Intervention
<b>Language</b>	English
<b>Study design</b>	Systematic reviews, observational studies (evidence in CG37 was predominantly from case control studies)
<b>Status</b>	Published papers (full text only)
<b>Population</b>	Infants (up to 1 year)
<b>Intervention</b>	<p>Bed-sharing or co-sleeping</p> <ul style="list-style-type: none"> <li>- Will need to initially consider both terms as identified previously at times they are used interchangeably in the studies (co-sleeping may not necessarily be bed-sharing)</li> <li>- The addendum update will clarify the definitions of the terminology used</li> </ul>
<b>Comparator</b>	Non bed-sharing or co-sleeping (within the definitions of these terms to be used in this update)
<b>Outcomes</b>	Sudden infant death syndrome (as defined in the included studies)
<b>Other criteria for inclusion/exclusion</b>	<p>Include; infants up to 1 year</p> <p>Exclude; narrative reviews, case series, case studies</p>
<b>Review strategies</b>	<ul style="list-style-type: none"> <li>- Data on all included studies will be extracted into evidence tables</li> </ul>

	<b>Details</b>
	<ul style="list-style-type: none"><li>- Where statistically possible, a meta-analytical approach will be used to give an overall summary effect</li><li>- All key outcomes from evidence will be presented in GRADE profiles or modified profiles and further summarised in evidence statements</li></ul>

## Appendix D: Search strategy

**Table 3: Clinical search summary**

Database	Date searched	Number retrieved
CDSR (Wiley)	20 <sup>th</sup> Feb 2014	1
DARE	20 <sup>th</sup> Feb 2014	0
HTA database (Wiley)	20 <sup>th</sup> Feb 2014	1
CENTRAL (Wiley)	20 <sup>th</sup> Feb 2014	49
NHS EED (Wiley)	20 <sup>th</sup> Feb 2014	0
MEDLINE (Ovid)	20 <sup>th</sup> Feb 2014	995
MEDLINE In-Process (Ovid)	20 <sup>th</sup> Feb 2014	60
EMBASE (Ovid)	20 <sup>th</sup> Feb 2014	1094
PsycInfo	20 <sup>th</sup> Feb 2014	375
Cinahl	20 <sup>th</sup> Feb 2014	357
PubMed	20 <sup>th</sup> Feb 2014	145

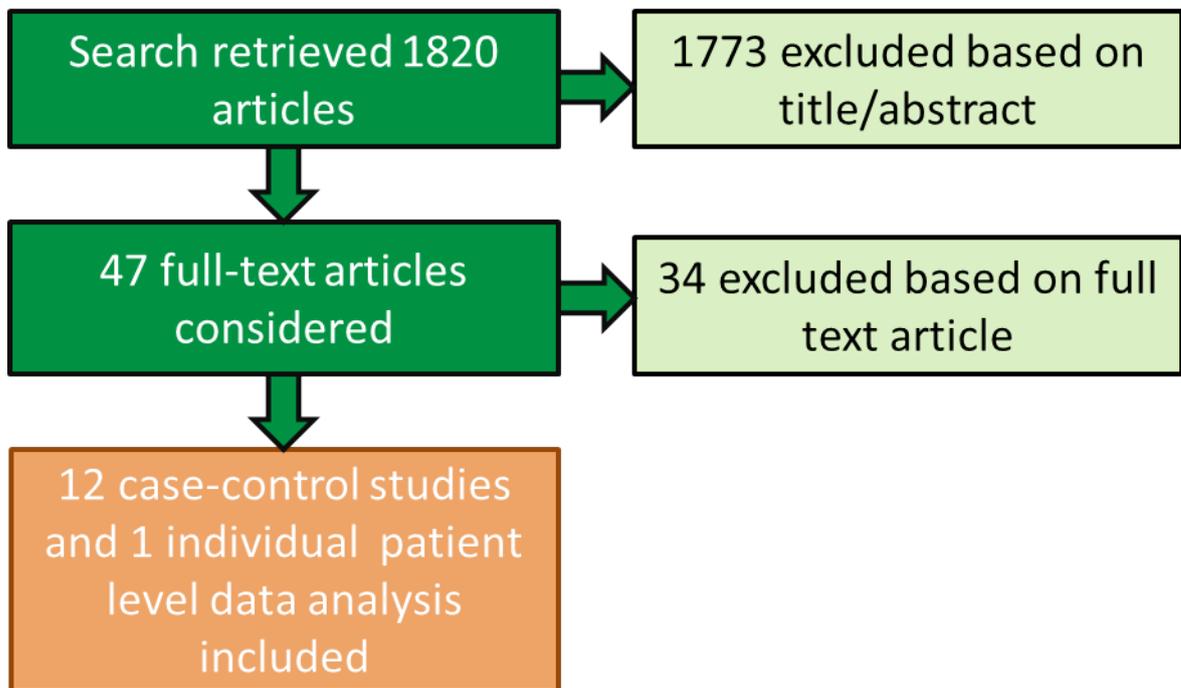
**Table 4: Clinical search terms (Medline)**

Line number	Search terms	Number retrieved
1	(co-sle\$ or "co sle\$" or cosle\$).tw.	203
2	(co-bed\$ or "co bed\$" or cobed\$).tw.	32
3	(bed\$ adj4 shar\$).tw.	480
4	bedshar\$.tw.	57
5	(shar\$-sleep\$ or "shar\$ sleep\$").tw.	22
6	(same adj4 bed\$).tw.	359
7	or/1-6	1070
8	limit 7 to english language	995

**Table 5: Clinical search terms (Embase)**

Line number	Search terms	Number retrieved
1	bed sharing/	172
2	(co-sle\$ or "co sle\$" or cosle\$).tw.	293
3	(co-bed\$ or "co bed\$" or cobed\$).tw.	44
4	(bed\$ adj4 shar\$).tw.	624
5	bedshar\$.tw.	80
6	(shar\$-sleep\$ or "shar\$ sleep\$").tw.	31
7	(same adj4 bed\$).tw.	550
8	or/1-7	1534
9	limit 8 to english language	1405
10	limit 9 to embase	1094

## Appendix E: Review flow chart



## Appendix F: Excluded studies

**Table 6: Clinical search; excluded studies**

Reference	Reason for exclusion
Adler MR, Hyderi A, Hamilton A. What are safe sleeping arrangements for infants? <i>Journal of Family Practice</i> . 2006; 55(12):1083	Commentary
Alexander RT, Radisch D. Sudden infant death syndrome risk factors with regards to sleep position, sleep surface, and co-sleeping. <i>J Forensic Sci</i> . 2005; 50(1):147-15	Review of autopsy reports
Alm B, Mollborg P, Erdes L, et al. SIDS risk factors and factors associated with prone sleeping in Sweden. <i>Arch Dis Child</i> . 2006; 91(11):915-919	Does not include co-sleeping outcomes
Arnestad M, Anderson M, Vege A, Rognum TO. Changes in the epidemiological pattern of sudden infant death syndrome in southeast Norway, 1984-1998: implications for future prevention and research. <i>Arch Dis Child</i> . 2001; 85(2):108-115	Changes in epidemiology of SIDS over time
Baddock SA, Galland BC, Bolton DPG, et al. Differences in infant and parent behaviours during routine bed sharing compared with cot sleeping in the home setting. <i>Pediatrics</i> . 2006; 117(5):1599-1607	Behaviours of bed-sharing parents and infants
Beeman G, Presbury G et al. Bed-sharing during the first year of life in Memphis. <i>Journal of Investigative Medicine</i> . 2011; 59(2):476	Abstract
Blabey MH, Gessner BD. Infant bed-sharing practices and associated risk factors among births and infant deaths in Alaska. <i>Public Health Rep</i> . 2009; 124(4):527-534	Retrospective review of records and reports
Blair PS, Heron J, Fleming et al. Relationship between bed sharing and breastfeeding: longitudinal, population-based analysis. <i>Pediatrics</i> . 2010; 126(5):996-997	Abstract
Blair PS, Sidebottom P et al. Major epidemiological changes in sudden death syndrome: a 20-year population-based study in the UK. <i>Lancet</i> . 2006; 367(9507):314-319	Changes in sleeping behaviour following campaign to put infants to sleep on their back
Bubnaitiene V, Kalediene R et al. Case-control study of sudden infant death in Lithuania, 1997-2000. <i>BMC Pediatr</i> . 2005. 5:41	Small cases sample size
Carroll-Pankhurst C, Mortimer EAJ et al. Sudden infant death syndrome, bed sharing, parental weight, and age at death. <i>Pediatrics</i> . 2001. 107(3): 530-536	Case series
Das RR, Sankar MJ et al. Is "bed sharing" beneficial and safe during infancy? A systematic review. <i>International Journal of Pediatrics</i> . 2014.	Inappropriate method of combining data in meta-analysis
Elder DE, Zuccollo JM et al. Neonatal sudi in New Zealand 1997-2011. <i>J Pediatr Child Health</i> . 2013. 49:70	Letter
Escott A, Elder DE, Zuccollo JM. Sudden unexpected infant death and bedsharing:referrals to the Wellington Coroner 1997-2006. <i>NZ Med J</i> . 2009. 122(1298):59-68	Retrospective review of cases
Fu LY, Colson ER et al. Infant sleep location: associated maternal and infant characteristics with sudden infant death syndrome prevention recommendations. <i>J Pediatr</i> . 2008. 153(4):503-508	Infant care practices – related to bed-sharing
Gabbaian L. Co-sleeping through the night:SIDS and homecare. <i>Neonatal Intensive Care</i> . 2006. 19(4):35-38	Narrative review
Glasgow JFT, Thompson AJ, Ingram PJ. Sudden unexpected death in infancy: place and time of death. <i>Ulster Med J</i> . 2006. 75(1):65-71	Autopsy report reviews
Hawkes N. Sharing a bed with your baby increases the risk of sudden infant death syndrome, UK study shows. <i>BMJ</i> . 2013. 346:f3296	Brief news report

Reference	Reason for exclusion
Hoffend C, Sherhake JP. Sudden unexpected death in infancy (SUDI) in the early neonatal period: the role of bed sharing. <i>Forensic Sci Med Pathol.</i> 2014	Review of cases
Horsley T, Clifford T et al. Benefits and harms associated with the practice of bed sharing: a systematic review. <i>Arch Pediatr Adolesc Med.</i> 2007. 161(3):237-245	Unable to pool data, unclear if bed-sharing or co-sleeping
McKenna JJ, Mosko S. Evolution And infant sleep: an experimental study of infant-parent co-sleeping and its implications for SIDS. <i>Acta Pediatr Suppl.</i> 1993. 82suppl 389:31-36	Study based in a sleep lab
Matthews T, McDonnell M et al. A multivariate "time based" analysis SIDS risk factors. <i>Arch Dis Child.</i> 2004. 89(3):267-271	Methods paper for McGarvey
Mitchell EA, Esmail A et al. Do differences in the prevalence of risk factors explain the higher mortality from sudden infant death syndrome in New Zealand compared with the UK? <i>NZ Med J.</i> 1996. 109(1030):352-355	Review of cases
Nelson T, To KF et al. Hong Kong case-control study of sudden unexpected infant death. <i>NZ Med J.</i> 2005. 188(1277):U1788	Small cases sample size
Ostfeld BM, Perl H et al. Sleep environment, positional, lifestyle and demographic characteristics associated with bed sharing in sudden infant death syndrome cases: a population-based study. <i>Pediatrics.</i> 2006. 118(5):2051-2059	Review of cases
Shields LBE, Hunsaker DM et al. Risk factors associated with sudden unexplained infant death: a prospective study of infant care practices in Kentucky. <i>Pediatrics.</i> 2005. 116(1):e13-e20	Care practices
Vennemann MM, Hense HW et al. Bed sharing and the risk of sudden infant death syndrome: can we resolve the debate? <i>J Pediatr.</i> 2012. 160(1):44-48	Methodology for the meta-analysis, did not use individual patient data, combined OR from initial studies
Vennemann MMT, Findeisen M et al. Modifiable risk factors for SIDS in Germany: results of GeSID. <i>Acta Pediatr.</i> 2005. 94(6):655-660	Earlier outcomes from Venneman (2009)
Wailoo M, Ball H et al. Infants bed sharing with mothers. <i>Arch Dis Child.</i> 2004. 89(12):1082-1083	Review
Weber MA, Risdon RA et al. Autopsy findings of co-sleeping-associated sudden unexpected deaths in infancy relationship between pathological features and asphyxial mode of death. <i>J Pediatr Child Health.</i> 2012. 48(4):335-341	Autopsy records review
Weber MA, Ashworth MT et al. Sudden unexpected neonatal death in the first week of life: autopsy findings from a specialist centre. <i>J Matern Fetal neonatal Med.</i> 2009. 22(5):398-404	Review of SIDS autopsies
Yoo SH, Kim AJ et al. Sudden infant death syndrome in Korea: a retrospective analysis of autopsy-diagnosed cases. <i>J Korean Med Sci.</i> 2013.28(3):438-442	Review of autopsy reports
Zhang K, Wand X et al. Maternal smoking and increased risk of sudden infant death syndrome: a meta-analysis. <i>Leg Med (Tokyo).</i> 2013. 15(3):115-121	Inappropriate method of combining data in meta-analysis

## Appendix G: Evidence tables

**Table 7: Individual patient data meta-analysis**

Bibliographic reference	Carpenter et al (2013) Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case-control studies. <i>BMJ Open</i>
Study type and aim	Individual level analysis of case-control studies Aim: to resolve uncertainty as to the risk of SIDS associated with sleeping in bed with your baby if neither parent smokes and the baby is breastfed
Cases	N=1472  Included studies; <ul style="list-style-type: none"> <li>- European Concerted Action on SIDS (ECAS) (a set of 20 studies, 5 of these were excluded due to absence of data on feeding or unwillingness to participate)</li> <li>- Study in Scotland 1996-2000</li> <li>- Study in New Zealand 1987-1990</li> <li>- Study in Ireland 1994-2003</li> <li>- GeSID study in Germany 1998-2001</li> </ul> Cases >1yr excluded
Controls	N=4679  Cases >1yr excluded
Location	UK
Outcomes measures and effect size	Bed-sharing defined as when one or both parents slept with the baby in their bed so that they woke to find the baby dead in bed with them. Controls were bed-sharing if the baby was in bed with them when they awoke on the day of the interview  Cases and controls co-sleeping on a sofa or elsewhere were included  Other definitions;

Bibliographic reference	Carpenter et al (2013) Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case-control studies. <i>BMJ Open</i>																						
	<ul style="list-style-type: none"> <li>- Room sharing, sleeping in the parents' room but not in the parents bed</li> <li>- Breastfed, infant was being partially or completely breastfed at the time of death or interview</li> <li>- Bottle fed, the infant was not breastfed at this time</li> <li>- Parents, mother and current partner</li> </ul> <p>NOTE: cases and controls co-sleeping on a sofa or elsewhere were grouped with those not bed-sharing and not sleeping in the parents' room</p> <p>Combined individual data to estimate the risk associated with bed-sharing in relation to breastfeeding, smoking, mother's recent alcohol consumption and illegal drug use after controlling for the other most important risk predictors, namely whether the baby slept in the parents' room or elsewhere, position in which the baby is put to sleep , mother single, mother's age and parity and baby's birth weight (these five data sets included all cases that some might now classify as 'unascertained' or 'asphyxia' because they were found to be bed-sharing or sleeping face down)</p> <p>Imputed data where there were missing values. (The authors considered that analysis showed that missing values were plausibly missing at random dependent on the study)</p> <p>Missing data; bed-sharing (0.9%), feeding (0.8%), position last left (1.6%), parental smoking (2.9%), mother took <math>\geq 2</math>units of alcohol in the last 24hrs (61.3%), mother used illegal drugs after birth (60.5%), RACE (0.3%)</p> <p><b>Results</b> <b>Cases/controls for bed-sharing:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Bed-sharing</th> <th>Cases (%)</th> <th>Controls (%0</th> <th>Univariate OR (95%CI) (complete records)</th> <th>Univariate OR (95%CI) (with imputed data)</th> <th>Multivariate OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>1131 (77.8%)</td> <td>4192 (90.4%)</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>Yes</td> <td>323 (22.2%)</td> <td>446 (9.6%)</td> <td>2.6 (2.2 to 3.1)</td> <td>2.6 (2.2 to 3.1)</td> <td>2.7 (1.4 to 5.3)</td> </tr> </tbody> </table> <p>Baseline for multivariate; breastfed baby placed on back, in a cot, in parents' room, neither of whom smokes nor has any other risk factors</p> <p>Other factors in the multivariate model; feeding, position last left, parental smoking, mother took 2unit or more of alcohol in last 24hr, mother used illegal drug after birth, unmatched studies, matched studies, race, birth weight (groups), mother's age in</p>					Bed-sharing	Cases (%)	Controls (%0	Univariate OR (95%CI) (complete records)	Univariate OR (95%CI) (with imputed data)	Multivariate OR (95%CI)	No	1131 (77.8%)	4192 (90.4%)	1	1	1	Yes	323 (22.2%)	446 (9.6%)	2.6 (2.2 to 3.1)	2.6 (2.2 to 3.1)	2.7 (1.4 to 5.3)
Bed-sharing	Cases (%)	Controls (%0	Univariate OR (95%CI) (complete records)	Univariate OR (95%CI) (with imputed data)	Multivariate OR (95%CI)																		
No	1131 (77.8%)	4192 (90.4%)	1	1	1																		
Yes	323 (22.2%)	446 (9.6%)	2.6 (2.2 to 3.1)	2.6 (2.2 to 3.1)	2.7 (1.4 to 5.3)																		

Bibliographic reference	Carpenter et al (2013) Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case-control studies. <i>BMJ Open</i>				
	years (groups), number of live births including the present one, mother's marital status, where last slept				
	<b>Avoidable factors that interact with bed-sharing adjusted for all other factors:</b>				
	<b>Factor</b>	<b>Room sharing AOR (95%CI)</b>	<b>Bed-sharing at 2wks AOR (95%CI)</b>	<b>Bed-sharing at 10wks AOR (95%CI)</b>	<b>Bed-sharing at 20wks AOR (95%CI)</b>
	Position last left				
	Back	1.0			1.2 (0.6 to 2.8)
	Side	1.8 (1.3 to 2.4)	8.3 (3.7 to 18.6)	3.6 (1.8 to 7.2)	0.8 (0.3 to 2.0)
	Front	12.0 (8.6 to 16.8)			5.3 (1.8 to 16.0)
	Parental smoking				
	None	1.0	8.3 (3.7 to 18.6)	3.6 (1.8 to 7.2)	1.2 (0.6 to 2.8)
	Partner	1.1 (0.8 to 1.4)	17.6 (8.1 to 38.5)	7.6 (3.8 to 15.1)	2.6 (1.2 to 6.0)
	Mother	1.5 (1.2 to 2.1)	47.5 (18.9 to 118.9)	20.4 (8.9 to 47.7)	7.1 (2.8 to 18.0)
	Both	2.9 (2.3 to 3.6)	64.9 (30.8 to 136.9)	28.0 (15.0 to 52.3)	9.7 (4.7 to 20.2)
	Mother's alcohol				
	2+ vs <2units or none	4.7 (2.6 to 8.7)	89.7 (25.3 to 317.7)	38.6 (12.6 to 117.8)	13.5 (4.6 to 39.4)
	Mother's illegal drug user				
	Yes vs No	11.4 (2.2 to 57.8)	Inestimable		
	All AOR are adjusted for other factors in the table and bottle feeding, sex, whether matched or unmatched, race, birth weight group, mother's age group, number of live births (grouped), mother single and where slept (The three ages were selected to illustrate the reduction in risks associated with bed-sharing as the baby gets older) (Should be noted that the mother's alcohol and mother's illegal drug user were available in just 2 of the included datasets)				
Source of funding	This combined analysis was not grant funded				
Comments	Univariate analyses adjusted for age and study as controls were on average 3wks older than cases Multivariate adjusted OR, used a multilevel logit regression model with bed-sharing random across studies The fraction of bed-sharing deaths attributable to bed-sharing (those that would not have occurred had the babies not been bed-sharing but placed supine on a cot in the parents' room)				

**Table 8: Case-control studies**

<b>Bibliographic reference</b>	<b>Blair et al (1999) Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. BMJ (in CG37)</b>
Study type and aim	Case-control (questionnaire based interviews at home visits) Aim: to investigate the risks associated with different sleeping environments and how factors relating to parenting practice, both routine and specific, affect the infant
Cases	N=325 Three former health regions (South West, Northern and Yorkshire) for Feb 1993 to Jan 1995 and Wessex and Northern regions for Apr 1995 to March 1996. Aimed to include all cases of sudden unexpected deaths of infants aged 7 to 364days from a study population of 17.7million Cause of death established by a multidisciplinary committee, following full necropsy All deaths were classified according to the Avon clinicopathological system  Bereaved families visited within days for a narrative account, again within 2wks for questionnaire completion
Controls	N=1300 4 controls for each case selected. Health visitors for the cases asked to identify 2 controls born in the 2wks before the case and 2 born in the 2wks after  Visited within a week of the case death to collect the same data as the case; a period of sleep in the control (reference sleep) identified in the control infant's life in the 24hrs before the interview corresponding to the time of day during which the case had died  The age of the control infant was taken as the age at the reference sleep in the 24hrs before the interview (because of the time lag to arrange four control interviews the control infants were on average 10days older than the index infants)
Questionnaire/interview	Questionnaire asked over 600 fields, including; <ul style="list-style-type: none"> <li>- Demographic and social data</li> <li>- The medical history of the infant and other family members</li> <li>- Use of cigarettes, alcohol, and drugs</li> <li>- The precise sleeping arrangements for the infant</li> </ul>

Bibliographic reference	Blair et al (1999) Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. BMJ (in CG37)																																																										
	- Full details of the events preceding and the circumstances surrounding the death (or relevant sleep)																																																										
Location	UK																																																										
Outcomes measures and effect size	<p>Not normal distribution, used medians and IQR, Mann-Whitney Conditional logistic regression – factors adjusted for in multivariate model all significant in univariate and multivariate analysis at the 5% level after stepwise logistic regression</p> <p>N=24/363 families where the death was classified as sudden infant death syndrome refused an interview (14 were excluded due to police involvement)</p> <p><b>Results</b> <b>Sleeping environment:</b> Usual room sharer; infants who usually shared parental bedroom but not bed Usual solitary sleeper; infants who slept in room separate from parents either alone or with other siblings Usual bed sharer; infants who usually shared parental bed for more than two nights/wk</p> <table border="1"> <thead> <tr> <th>Sleeping environment</th> <th>Cases (%)</th> <th>Controls (%)</th> <th>OR* (95%CI)</th> </tr> </thead> <tbody> <tr> <td colspan="4">All</td> </tr> <tr> <td>No. of babies</td> <td>320 #</td> <td>1299 #</td> <td></td> </tr> <tr> <td>Usual room sharer</td> <td>189 (59.1)</td> <td>813 (62.6)</td> <td></td> </tr> <tr> <td>Usual solitary sleeper</td> <td>77 (24.1)</td> <td>410 (31.6)</td> <td>1.00</td> </tr> <tr> <td>Usual room sharer</td> <td>54 (16.9)</td> <td>76 (5.9)</td> <td>0.88 (0.62 to 1.25)</td> </tr> <tr> <td colspan="4">Socioeconomic classes I, II, III, non-manual</td> </tr> <tr> <td>No. of babies</td> <td>128 ~</td> <td>850 ~</td> <td></td> </tr> <tr> <td>Usual room sharer</td> <td>69 (53.9)</td> <td>497 (58.5)</td> <td>1.00</td> </tr> <tr> <td>Usual solitary sleeper</td> <td>42 (32.8)</td> <td>312 (36.7)</td> <td>1.33 (0.78 to 2.27)</td> </tr> <tr> <td>Usual room sharer</td> <td>17 (13.3)</td> <td>41 (4.8)</td> <td>4.07 (1.75 to 9.46)</td> </tr> <tr> <td colspan="4">Socioeconomic classes III, manual, IV, V and unemployed</td> </tr> <tr> <td>No. of babies</td> <td>190 ~</td> <td>446 ~</td> <td></td> </tr> <tr> <td>Usual room sharer</td> <td>118 (62.1)</td> <td>315 (70.6)</td> <td>1.00</td> </tr> </tbody> </table>			Sleeping environment	Cases (%)	Controls (%)	OR* (95%CI)	All				No. of babies	320 #	1299 #		Usual room sharer	189 (59.1)	813 (62.6)		Usual solitary sleeper	77 (24.1)	410 (31.6)	1.00	Usual room sharer	54 (16.9)	76 (5.9)	0.88 (0.62 to 1.25)	Socioeconomic classes I, II, III, non-manual				No. of babies	128 ~	850 ~		Usual room sharer	69 (53.9)	497 (58.5)	1.00	Usual solitary sleeper	42 (32.8)	312 (36.7)	1.33 (0.78 to 2.27)	Usual room sharer	17 (13.3)	41 (4.8)	4.07 (1.75 to 9.46)	Socioeconomic classes III, manual, IV, V and unemployed				No. of babies	190 ~	446 ~		Usual room sharer	118 (62.1)	315 (70.6)	1.00
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Bibliographic reference	Blair et al (1999) Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. BMJ (in CG37)				
	Usual solitary sleeper	35 (18.4)	97 (21.7)	0.67 (0.30 to 1.48)	
	Usual room sharer	37 (19.5)	34 (7.6)	2.66 (1.19 to 5.98)	
	*adjusted for infant age				
	# N=5 cases, n=1 control, insufficient information on sleeping environment collected to include them in the analysis				
	~ N=2 cases, n=3 controls, socioeconomic class of family could not be accurately ascertained				
	<b>Sleeping environment for the reference sleep:</b>				
	Bed sharer; includes all infants who shared same sleeping place (bed or sofa) with at least one parent for any part of last or reference sleep				
	<b>Sleeping environment</b>	<b>Cases (n=321<sup>#</sup>, %)</b>	<b>Controls (n=1299<sup>#</sup>)</b>	<b>OR* (95%CI)</b>	
	Room sharer	71 (25.3)	506 (39.0)	1.00	
	Solitary sleeper	114 (35.6)	420 (32.3)	1.94 (1.33 to 2.81)	
	Bed sharer	126 (39.4)	373 (28.7)	2.00 (1.38 to 2.90)	
	*adjusted for infant age				
	# N=4 cases, n=1 control, insufficient information on sleeping environment collected to include them in the analysis				
	<b>Sleeping environment in relation to parents; reference sleep:</b>				
	<b>Sleeping environment</b>	<b>Cases (n=321, %)</b>	<b>Controls (n=1299)</b>	<b>OR* (95%CI)</b>	<b>Multivariate OR<sup>#</sup> (95%CI)</b>
	Room sharer	71 (25.3)	506 (39.0)	1.00	1.00
	Solitary sleeper	114 (35.6)	420 (32.3)	1.92 (1.32 to 2.80)	10.49 (4.26 to 25.81)
	Bed sharer (put back in own cot)	24 (7.5)	178 (13.7)	0.66 (0.38 to 1.13)	0.67 (0.22 to 2.00)
	Bed sharer (at the end of sleep)	82 (25.5)	189 (14.5)	2.75 (1.85 to 4.08)	9.78 (4.02 to 23.83)
	Sofa sharer	20 (6.2)	6 (0.5)	31.25 (8.78 to 111.23)	48.99 (5.04 to 475.60)
	*adjusted for infant age				

Bibliographic reference	Blair et al (1999) Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. BMJ (in CG37)																									
	<p># controlled for maternal age, parity (1 vs &gt;1 child), gestational age, multiple births, unemployment, overcrowding, maternal smoking during pregnancy, paternal smoking, paternal drug use, daily postnatal exposure to tobacco smoke, previous episode of apparent life threatening event according to parents, maternal anxiety over infant becoming too hot, infant put down in prone or side position for last sleep, infant being found after last sleep with bedcovers overhead, use of dummy for any part of last sleep, use of pillow, recent maternal alcohol consumption before last sleep, parental estimate of poor sleep, parental tiredness, change in routine affecting infant, sleeping under duvet and thickness</p> <p>Factors in the multivariate model that predominantly involved infants sleeping in a cot rather than the parental bed;</p> <ul style="list-style-type: none"> <li>- Infants in the prone sleeping position (20.8% cases in cots vs 2.5% cases in a shared bed)</li> <li>- Placed on a pillow (11.6% cases in cots vs 1.2% cases in a shared bed)</li> <li>- Infants found with their head covered (19.0% cases in cots vs 6.9% cases in a shared bed)</li> </ul> <p>Removal of these factors affected the association being found in a shared bed; multivariate OR 4.62 (2.34 to 9.09)</p> <p><b>Age:</b> Infants who died in parental bed, median age 8wks (IQ range 4-13wks), were younger than those found elsewhere, median age 15wks (IQ range 10-23wks)</p> <p>Younger (&lt;median age, 14wks 2days) and older infants (&gt;14wks 2days):</p> <ul style="list-style-type: none"> <li>- Risk associated with bed sharing, younger; OR 4.65 (2.70 to 7.99)</li> <li>- Risk associated with bed sharing, older; OR 1.08 (0.55 to 2.11)</li> </ul> <p><b>Relation between parental smoking and bed sharing:</b> Parents who did not smoke cases found dead in bed 2.2% vs 7.9% controls who did not smoke</p> <table border="1"> <thead> <tr> <th>≥1 parent smokes</th> <th>Bed sharing</th> <th>Cases (n=321)</th> <th>Controls (n=1299)</th> <th>OR<sup>#</sup> (95%CI)</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>No</td> <td>44 (13.7)</td> <td>582 (44.8)</td> <td>1.00</td> </tr> <tr> <td>No</td> <td>Yes</td> <td>7 (2.2)</td> <td>103 (7.9)</td> <td>10.49 (4.26 to 25.81)</td> </tr> <tr> <td>Yes</td> <td>No</td> <td>195 (60.7)</td> <td>528 (40.6)</td> <td>0.67 (0.22 to 2.00)</td> </tr> <tr> <td>Yes</td> <td>Yes</td> <td>75 (23.4)</td> <td>86 (6.6)</td> <td>9.78 (4.02 to 23.83)</td> </tr> </tbody> </table> <p>*adjusted for infant age</p>	≥1 parent smokes	Bed sharing	Cases (n=321)	Controls (n=1299)	OR <sup>#</sup> (95%CI)	No	No	44 (13.7)	582 (44.8)	1.00	No	Yes	7 (2.2)	103 (7.9)	10.49 (4.26 to 25.81)	Yes	No	195 (60.7)	528 (40.6)	0.67 (0.22 to 2.00)	Yes	Yes	75 (23.4)	86 (6.6)	9.78 (4.02 to 23.83)
≥1 parent smokes	Bed sharing	Cases (n=321)	Controls (n=1299)	OR <sup>#</sup> (95%CI)																						
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No	Yes	7 (2.2)	103 (7.9)	10.49 (4.26 to 25.81)																						
Yes	No	195 (60.7)	528 (40.6)	0.67 (0.22 to 2.00)																						
Yes	Yes	75 (23.4)	86 (6.6)	9.78 (4.02 to 23.83)																						

Bibliographic reference	<b>Blair et al (1999) Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. BMJ (in CG37)</b>				
	Multivariate model controlling for adverse bed sharing conditions:				
	<b>Sleeping environment</b>	<b>Cases (n=312, %)</b>	<b>Controls (n=1295)</b>	<b>Multivariate OR* (95%CI)</b>	<b>P value</b>
	Solitary sleeper	111 (35.6)	419 (32.4)	1.96 (1.31 to 2.93)	0.001
	Bed sharer (put back in own cot)	24 (7.7)	178 (13.7)	0.60 (0.33 to 1.08)	0.09
	Bed sharer (at the end of sleep)	79 (25.3)	186 (14.4)	1.35 (0.83 to 2.20)	0.23
	Sofa sharer	20 (6.4)	6 (0.5)	25.86 (6.72 to 99.47)	<0.0001
	Parental tiredness	86 (27.6)	191 (14.7)	2.42 (1.61 to 3.63)	<0.0001
	Maternal alcohol consumption	37 (11.9)	41 (3.2)	3.40 (1.88 to 6.16)	<0.0001
	Overcrowding	13 (4.2)	4 (0.3)	18.49 (3.62 to 94.48)	0.0005
	Duvet tog:				
	1-4	37 (11.9)	139 (10.7)	1.47 (0.90 to 2.39)	0.12
	5-8	59 (18.9)	91 (7.0)	3.97 (2.43 to 6.46)	<0.0001
	≥9	26 (8.3)	32 (2.5)	3.26 (1.54 to 6.90)	0.002
Source of funding	The National Advisory Body for CESDI and the Foundation for the Study of Infant Deaths				
Comments					

Bibliographic reference	<b>Blair et al (2006) Sudden infant death syndrome and sleeping position in pre-term and low birth weight infants: an opportunity for targeted intervention. Arch Dis Child (pre-term and low birth weight subgroups of Blair et al 1999)</b>
Study type and aim	Case-control (questionnaire based interviews at home visits) Aim: to determine the combined effects of SIDS risk factors in the sleeping environment for infants who were pre-term (<37wks), low birth weight (<2500g), or both
Cases	N=325 See Blair et al 1999

<b>Bibliographic reference</b>	<b>Blair et al (2006) Sudden infant death syndrome and sleeping position in pre-term and low birth weight infants: an opportunity for targeted intervention. Arch Dis Child (pre-term and low birth weight subgroups of Blair et al 1999)</b>																																																																											
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Location	UK																																																																											
Outcomes measures and effect size	<p>Bed sharing – those found after the last sleep co-sleeping with at least one parents (on a mattress, sofa, or chair) – however this is then defined as co-sleeping in the tables included in this paper</p> <p>Small at birth, &lt;37wks of gestation, or birth weight &lt;2500g</p> <p>Used medians and IQR</p> <p>Conditional logistic regression – models constructed with backward stepwise procedure (for variables significant at 5% level)</p> <p><b>Results</b> <b>Pre-term and low birth weight:</b></p> <table border="1"> <thead> <tr> <th></th> <th>Cases (%)</th> <th>Controls (%)</th> <th>OR* (95%CI)</th> <th>P value</th> <th>Multivariate OR* (95%CI)</th> <th>P value</th> </tr> </thead> <tbody> <tr> <td>Pre-term:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>No</td> <td>260 (80.5%)</td> <td>1218 (94.6%)</td> <td>1.00</td> <td></td> <td>1.00</td> <td></td> </tr> <tr> <td>Yes</td> <td>63 (19.5%)</td> <td>70 (5.4%)</td> <td>3.82 (2.55 to 5.72)</td> <td>&lt;0.0001</td> <td>7.96 (3.25 to 19.48)</td> <td>&lt;0.0001</td> </tr> <tr> <td>Low birth weight:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>No</td> <td>251 (77.2%)</td> <td>1226 (94.9%)</td> <td>1.00</td> <td></td> <td>1.00</td> <td></td> </tr> <tr> <td>Yes</td> <td>74 (22.8%)</td> <td>66 (5.1%)</td> <td>5.34 (3.53 to 8.06)</td> <td>&lt;0.0001</td> <td>5.09 (2.30 to 11.27)</td> <td>&lt;0.0001</td> </tr> <tr> <td>Small at birth:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>No</td> <td>238 (73.7%)</td> <td>1185 (92.1%)</td> <td>1.00</td> <td></td> <td>1.00</td> <td></td> </tr> <tr> <td>Yes</td> <td>85 (26.3%)</td> <td>101 (7.9%)</td> <td>3.76 (2.64 to 5.36)</td> <td>&lt;0.0001</td> <td>5.23 (2.52 to 10.89)</td> <td>&lt;0.0001</td> </tr> </tbody> </table> <p>*adjusted for infant age</p>							Cases (%)	Controls (%)	OR* (95%CI)	P value	Multivariate OR* (95%CI)	P value	Pre-term:							No	260 (80.5%)	1218 (94.6%)	1.00		1.00		Yes	63 (19.5%)	70 (5.4%)	3.82 (2.55 to 5.72)	<0.0001	7.96 (3.25 to 19.48)	<0.0001	Low birth weight:							No	251 (77.2%)	1226 (94.9%)	1.00		1.00		Yes	74 (22.8%)	66 (5.1%)	5.34 (3.53 to 8.06)	<0.0001	5.09 (2.30 to 11.27)	<0.0001	Small at birth:							No	238 (73.7%)	1185 (92.1%)	1.00		1.00		Yes	85 (26.3%)	101 (7.9%)	3.76 (2.64 to 5.36)	<0.0001	5.23 (2.52 to 10.89)	<0.0001
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	<p>Interactions between co-sleeping in the parental bed x being small at birth, and sleeping in a room outside the parental bedroom x being small at birth:</p> <ul style="list-style-type: none"> <li>- Co-sleeping with parents (smoke); (univariate OR from table above), p=0.57</li> <li>- Co-sleeping with parents (smoke); (multivariate OR from table above), p=0.79</li> <li>- Co-sleeping with parents (don't smoke); (univariate OR from table above), p=0.75</li> <li>- Co-sleeping with parents (don't smoke); (multivariate OR from table above), p=0.29</li> <li>- Another room; (univariate OR from table above), p=0.88</li> <li>- Another room; (multivariate OR from table above), p=0.047</li> </ul>
Source of funding	The National Advisory Body for CESDI and the Foundation for the Study of Infant Deaths (FSID) and Babes in Arms
Comments	

<b>Bibliographic reference</b>	<b>Blair et al (2009) Hazardous cosleeping environments and risk factors amenable to change: case control study of SIDS in south west England. BMJ</b>
Study type and aim	Case-control (questionnaire used to obtain a narrative account from parents, home visit including investigation of the scene) Aim: to investigate whether some of the risk factors might be markers of socioeconomic deprivation
Cases	<p>N=80 (80 of the 90 deaths classed as due to SIDS)</p> <p>All sudden unexpected deaths from birth to age 2yrs (study population 4.9million) in Gloucestershire, Wiltshire, Bristol, Somerset, Devon and Cornwall, Jan 2003 to Dec 2006</p> <p>Cause of death (using Avon clinicopathological classification) established at multidisciplinary review meeting</p> <p>All sudden unexpected deaths notified within 24hrs via established notification network</p> <p>Cases contacted as soon as possible after death for narrative account, visited to complete questionnaire within 2wks</p>
Controls	<p>N=87 randomly chosen (87/92 approached)</p> <p>N=82 high risk families (82/95 approached)</p>

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	<p>2 groups of control infants at 28-30wks gestation from the stork maternity database Followed by longitudinally with 5 sequential postal questionnaires to 8mths Randomised control group and a control group considered at high risk of SIDS</p> <p>Age of infants and time of day of reference sleep were weighted to reflect approx. the ages and times of day at which the infants had died unexpectedly</p> <p>High-risk group;</p> <ul style="list-style-type: none"> <li>- Using most significant predictors of SIDS (modelled from previous study); maternal smoking, larger families, younger mothers, mothers classified as social class IV or V or never employed</li> <li>- Due to indirect contact (via post) anticipated low uptake among socially disadvantaged families – weighted the selection process for ‘random’ controls to match the maternal social class distribution of mothers with the social class distribution in Avon of the 1991 census</li> </ul>
Questionnaire/interview	<p>Full history including narrative account from parents, home visit including an investigation of the scene and circumstances of death (by a trained paediatrician or health visitor and member of the police child protection team)</p> <p>Interviewed controls using same questionnaire as cases and identified a specific time of sleep as reference within 24hrs of the interview</p>
Location	UK
Outcomes measures and effect size	<p>Co-sleeping defined as an infant sharing the same bed or sofa with an adult or a child</p> <p>Used medians and IQR</p> <p>Conditional logistic regression – backward stepwise, at the end of the modelling tested any variables with &gt;5% of data missing among cases and controls</p> <p><b>Results</b> <b>Co-sleeping:</b> Combined the who shared their parents’ bed and those who shared a sofa into a single group (54% SIDS infants cosleeping,</p>

Bibliographic reference	Blair et al (2009) Hazardous cosleeping environments and risk factors amenable to change: case control study of SIDS in south west England.BMJ																
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Bibliographic reference	Blair et al (2009) Hazardous cosleeping environments and risk factors amenable to change: case control study of SIDS in south west England.BMJ				
	<b>Random controls</b>				
	No	No	29/78 (37%)	52/87 (60%)	1.00 ref
	Yes	No	6/78 (8%)	17/87 (20%)	0.63 (0.18 to 1.93)
	No	Yes	19/78 (24%)	15/87 (17%)	2.27 (0.93 to 5.57)
	Yes	Yes	24/78 (31%)	3/87 (3%)	14.34 (3.78 to 78.76)
	<b>High risk controls</b>				
	No	No	29/78 (37%)	50/82 (61%)	1.00 ref
	Yes	No	6/78 (8%)	16/82 (20%)	0.65 (0.19 to 2.00)
	No	Yes	19/78 (24%)	12/82 (15%)	2.73 (1.07 to 7.03)
	Yes	Yes	24/78 (31%)	4/82 (5%)	10.34 (3.06 to 44.10)
	Recent alcohol or drug use - >2 units of alcohol or took methadone, cannabis, or amphetamines before last sleep				
	Multivariate model to test for interaction between co-sleeping and recent alcohol and drug use				
		<b>Cases vs random controls*</b>		<b>Cases vs high risk controls<sup>#</sup></b>	
		<b>OR (95%CI)</b>	<b>P value</b>	<b>OR (95%CI)</b>	<b>P value</b>
	Infant coslept in bed or sofa	5.41 (1.12 to 26.17)	0.04	5.23 (1.37 to 19.91)	0.02
	Parental use of alcohol or drugs before last sleep	0.52 (0.10 to 2.72)	0.44	0.69 (0.16 to 3.00)	0.62
	Interaction between co-sleeping and alcohol or drug use	53.26 (4.07 to 696.96)	0.002	11.76 (1.40 to 99.83)	0.02
	Recent alcohol or drug use - >2 units of alcohol or took methadone, cannabis, or amphetamines before last sleep				
	*adjusted for weighting factors; infant age, daytime/nighttime sleep, along with significant risk factors; maternal smoking during pregnancy, maternal education, infant found sleeping prone, infant swaddled, gestational age, not sharing room, fair or poor health in last 24hrs				
	<sup>#</sup> adjusted for weighting factors infant age, daytime/nighttime sleep, maternal smoking during pregnancy, number of live births, young maternal age, poor socioeconomic status, along with infant found sleeping prone, infant swaddled, infant palceed on pillow, gestational age, not sharing room, fair or poor health in last 24hrs				
Source of funding	The Foundation for the Study of Infant Deaths (FSID), Babes in Arms, and the charitable trusts of University Hospitals Bristol				
Comments					

<b>Bibliographic reference</b>	<b>Brooke et al (1997) Case-control study of sudden infant death syndrome in Scotland, 1992-5. BMJ (in CG37)</b>
Study type and aim	Case-control (questionnaire administered at home visits) Aim: to investigate the risk factors for sudden infant death syndrome in Scotland from 1992 to 1995
Cases	<p>N=201</p> <p>All infant deaths occurring after the 7<sup>th</sup> day of life to the end of 1yr from the registrar general for Scotland</p> <p>All deaths were classified using a standard necropsy protocol with agreed diagnostic criteria. Additionally all death certificates of infants aged 1wk to 1yr were scrutinised for possible misclassification of explained deaths.</p> <p>Sudden infant death syndrome; the sudden death of any infant or young child which is unexplained from the history and in which a through post-mortem exam fails to show an adequate cause for death</p> <p>Bereaved families visited within 21days of the death</p>
Controls	<p>N=276</p> <p>2 controls for each case selected.</p> <p>Controls identified from the births immediately before and after the index case in the same maternity unit</p> <p>Controls were matched for age, season and maternity unit</p> <p>All home visits were made within 21days of the index case's death</p>
Questionnaire/interview	<p>Questionnaire divided into 6 main categories;</p> <ul style="list-style-type: none"> <li>- Social and prenatal factors (socioeconomic status assessed on deprivation on the basis of postal code in 7 categories; also assessed using the registrar general's social class from the standard occupational classification)</li> <li>- Feeding regimen</li> <li>- Sleeping habits</li> <li>- Sleeping environment</li> <li>- Exposure to smoking (assessed in 2 ways; ordinal scale – neither parent smoked, father only smoked, mother only smoked, mother and father both smoked; calculated a dose response by determining the total no. of cigarettes smoked daily)</li> <li>- Illnesses</li> </ul>

Bibliographic reference	Brooke et al (1997) Case-control study of sudden infant death syndrome in Scotland, 1992-5. BMJ (in CG37)																			
Location	UK																			
Outcomes measures and effect size	<p>Questionnaires completed on n=147/201 cases and on n=276 controls N=108 cases had 2 controls; n=27 cases had 1 control; n=12 cases had no controls N=29 controls with no case</p> <p>The characteristics of the cases without an interview were compared with the characteristics of those with an interview and were similar in terms of maternal age, social class, and deprivation category There was a small difference in age at death of cases, p=0.04</p> <p>Univariate conditional logistic regression Multivariate logistic regression</p> <p><b>Results</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Risk factor</th> <th style="text-align: center;">Cases (%)</th> <th style="text-align: center;">Controls (%)</th> <th style="text-align: center;">OR (95%CI)</th> <th style="text-align: center;">P value</th> <th style="text-align: center;">Multivariate OR (95%CI)*</th> <th style="text-align: center;">P value</th> </tr> </thead> <tbody> <tr> <td>Routinely sleeps with parents</td> <td style="text-align: center;">11/146 (8%)</td> <td style="text-align: center;">6/275 (2%)</td> <td style="text-align: center;">3.92 (1.35 to 11.37)</td> <td style="text-align: center;">0.01</td> <td style="text-align: center;">2.90 (0.75 to 11.26)</td> <td style="text-align: center;">&gt;0.1</td> </tr> </tbody> </table> <p>*conditional logistic regression model, OR adjusted for exposure to smoking, does not regularly change position during sleep, old mattress, maternal age, deprivation score, drug treatment in previous wk, routine position put down to sleep, has moved under bedclothes, unmarried mother, social class IV or V, male sex, cot bumper not used routinely, any symptoms in previous wk, gestation ≤36wks, usually swaddled in previous wk, other infant death in family, usually sweaty on waking, tog value ≥10, mother left school aged ≤16yrs, not currently breast fed, ≥2 live births, birth wt &lt;2.5kg</p> <p>(results reported for the factors adjusted for in the multivariate analysis, not reported in this ET)</p>						Risk factor	Cases (%)	Controls (%)	OR (95%CI)	P value	Multivariate OR (95%CI)*	P value	Routinely sleeps with parents	11/146 (8%)	6/275 (2%)	3.92 (1.35 to 11.37)	0.01	2.90 (0.75 to 11.26)	>0.1
Risk factor	Cases (%)	Controls (%)	OR (95%CI)	P value	Multivariate OR (95%CI)*	P value														
Routinely sleeps with parents	11/146 (8%)	6/275 (2%)	3.92 (1.35 to 11.37)	0.01	2.90 (0.75 to 11.26)	>0.1														
Source of funding	Scottish Cot Death Trust																			
Comments																				

<b>Bibliographic reference</b>	<b>Carpenter et al (2004) Sudden unexplained infant death in 20 regions in Europe: case control study. The Lancet (in CG37)</b>
Study type and aim	Case-control (questionnaire based interviews) Aim: to combine the European Union Concerted Action on SIDS (ECAS) data and establish risks currently associated with previously suspected risk factors
Cases	N=745 Studies that used the ECAS protocol, 20 centres, September 1992 to April 1996 SIDS defined as; sudden and unexpected postperinatal infant death that is unexplained by clinical history, details of circumstances of death, and an adequate post-mortem examination. Pathology conferences ensured agreement on the interpretation of post-mortem findings (only cases with autopsies were included)  Median interval from death to interview 15 days (IQR 6 to 32)
Controls	N=2411 ≥2 controls for every case Selected from birth records or clinic lists, to represent live infants of the same age, living in the same survey area at the time  Median interval from death to control interview 18 days (IQR 4 to 38)
Questionnaire/interview	Closely similar epidemiological questionnaires for cases and controls, with comparable methods; <ul style="list-style-type: none"> <li>- Demographic data</li> <li>- 56 variables representing potential risk factors</li> </ul> To reduce recall bias – questions relating to terminal history of the case were replaced by corresponding questions for controls relating to the same time of the day before the interview
Location	UK
Outcomes measures and effect size	Bed-sharing; defined as all-night bed-sharing with an adult  Unconditional logistic regression to estimate OR associated with all variables or their combinations in isolation (unifactorial) – to manually build multivariate models

<b>Bibliographic reference</b>	<b>Carpenter et al (2004) Sudden unexplained infant death in 20 regions in Europe: case control study. The Lancet (in CG37)</b>				
	56 variables – data for 32 mostly completed, data for 24 not recorded by some centres. For the 24 incomplete variables obtained the OR for the variables included in the multivariate model. These AOR estimate their potential independent contribution to risk of SIDS (2 models used one for those with mostly completed data and one reported for the 10/24 that were significant after adjustment for the variables included in the first multivariate model)				
	<b>Results</b>				
	<b>Risk factors :</b>				
	Mother smoking and bed-sharing on last occasion				
	<b>Risk factor</b>	<b>Cases (%)</b>	<b>Controls (%)</b>	<b>Unifactorial OR</b>	<b>Multivariate OR (95%CI)</b>
	Mother did not smoke or bed-share	249 (34.6%)	1621 (67.8%)	1	1
	Mother did not smoke, did bed-share	32 (4.5%)	139 (5.8%)	1.61	1.56 (0.91 to 2.68)
	Mother smoked <10 cigarettes/day, did not bed-share	133 (18.5%)	328 (13.7%)	2.87	1.52 (1.10 to 2.09)
	Mother smoked >10 cigarettes/day, did not bed-share	194 (27.0%)	247 (10.3%)	5.64	2.43 (1.76 to 3.36)
	Mother smoked (any amount), did bed-share	111 (15.4%)	56 (2.3%)	14.8	17.7 (10.3 to 30.3)
	Other risk factors in the multivariate analysis; position last left, others in the household smoked after birth, dummy use, history of apparent life-threatening events, sex, multiple birth/singleton, birthweight, admitted to SCBU, UTI in pregnancy, mother's age, previous livebirths, marital status, partner employment				
	(Population attributable fractions (or risk)_derived from potentially modifiable factors – not reported in this ET)				
Source of funding	Grants from the European Union and the Foundation for the Study of Infant Deaths. The concerted action was funded by EC contract BMH1 CT93-1207 and PECO contract number CIPD CT 940219				
Comments					

<b>Bibliographic reference</b>	<b>Hauck et al (2003) Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago infant mortality study. Pediatrics (in CG37)</b>				
Study type and aim	Case-control (death scene investigation and interview with primary caregiver)				

Bibliographic reference	Hauck et al (2003) Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago infant mortality study. <i>Pediatrics</i> (in CG37)
	Aim: to examine risk factors for SIDS and other sudden death
Cases	<p>N=260</p> <p>All Chicago resident infants with SIDS deaths as determined by the Office of the Medical Examiner (Nov 1993 to April 1996)</p> <p>SIDS definition – the sudden death of an infant under 1yr which remains unexplained after a through case investigation, including complete autopsy, examination of the death scene and review of clinical history</p> <p>2wks after death standardised interview</p> <p>N=198/260, 76% had follow-up interview at 2wks; 95% mother, 3% foster parent/legal guardian, 2% other relatives</p>
Controls	<p>N=1300</p> <p>1 control for each case selected.</p> <p>Matched on (in order of priority), maternal race/ethnicity, age at death/interview, birth weight</p> <p>Identified through ongoing review of birth certificates at the Chicago Dept of Public Health</p> <p>Contacted simultaneously by mail and invited to participate. Those who responded were interviewed on a first come basis.</p>
Questionnaire/interview	<p>Death scene investigation included 400 questions, including:</p> <ul style="list-style-type: none"> <li>- Sleep environment when last put down and found</li> <li>- Infant's and family's medical history</li> <li>- Mother's prenatal alcohol, tobacco and drug use history</li> <li>- Other factors</li> <li>- Photographs were taken to indicate the location and position of the infant</li> </ul> <p>Interviews 2wks after death, 235 questions, including issues not included in the scene investigation;</p> <ul style="list-style-type: none"> <li>- Routine sleep habits of the infant</li> <li>- Social stressors and supports</li> <li>- Access to and satisfaction with health care</li> </ul>

<b>Bibliographic reference</b>	<b>Hauck et al (2003) Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago infant mortality study. Pediatrics (in CG37)</b>				
	For controls home interview with nearly 500 questions taken from the death scene investigation and case interview – reworded to apply to a living infant				
	Reference sleep period identified for the control to coincide with the time of day when the case infant was found unresponsive				
Location	USA				
Outcomes measures and effect size	Differences between cases and controls on non-matched demographic factors; case mothers younger (23.2±5.4 vs. 24.8±6.4, p<0.002; had lower education attainment (p<0.001), were more likely to be single (p<0.001), and had higher parity (p<0.001)				
	Bed-sharing defined as an infant sleeping with ≥1 people on the same sleep surface, such as a mattress or sofa				
	Conditional logistic regression Final multivariate model using backward step-down variable selection. Interactions tested between each of the sleep environment variables found significant on univariate analysis				
	<b>Results</b>				
	<b>Sleeping environment:</b>				
		<b>Cases (%)</b>	<b>Controls (%)</b>	<b>Unadjusted OR</b>	<b>Adjusted OR*</b>
	<b>Surface:</b>				
	Adult bed mattress	148 (56.9%)	151 (58.1%)	Ref group	Ref group
	Sofa/chair	26 (10.0%)	14 (5.4%)	2.0 (0.96 to 4.1)	1.6 (0.7 to 3.7)
	<b>Shared bed (with anyone):</b>				
	No	129 (49.6%)	181 (69.6%)	Ref group	Ref group
	Yes	131 (50.4%)	79 (30.4%)	2.7 (1.8 to 4.2)	2.0 (1.2 to 3.3)
	<b>Shared bed:</b>				
	No	129 (49.6%)	181 (69.6%)	Ref group	Ref group
	Yes (with mother or mother and father)	70 (26.9%)	59 (22.7%)	1.9 (1.2 to 3.1)	1.3 (0.7 to 2.3)
	Yes (with others)	61 (23.5%)	20 (7.7%)	5.4 (2.8 to 10.2)	4.1 (2.0 to 8.4)

<b>Bibliographic reference</b>	<b>Hauck et al (2003) Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago infant mortality study. Pediatrics (in CG37)</b>																						
	<p>*adjusted for maternal age, marital status, education, and index of prenatal care</p> <p>N=15 cases shared a sofa during sleep, when these were removed (with their matched controls) the ORs for bed sharing were similar</p> <p>Multivariate analysis (backward step-down variable selection); #adjusted for maternal age, marital status, education, and index of prenatal care and the other variables in the model:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 15%;">Cases</th> <th style="width: 15%;">OR<sup>#</sup></th> <th style="width: 20%;">Population attributable risk</th> </tr> </thead> <tbody> <tr> <td colspan="4"><b>Shared bed:</b></td> </tr> <tr> <td>No</td> <td>129</td> <td>Ref group</td> <td></td> </tr> <tr> <td>Yes (with mother or mother and father)</td> <td>70</td> <td>1.4 (0.7 to 2.8)</td> <td></td> </tr> <tr> <td>Yes (with others)</td> <td>61</td> <td>3.6 (1.4 to 9.4)</td> <td>17</td> </tr> </tbody> </table> <p>Results also on sleeping position and other factors, not reported in this ET.</p>				Cases	OR <sup>#</sup>	Population attributable risk	<b>Shared bed:</b>				No	129	Ref group		Yes (with mother or mother and father)	70	1.4 (0.7 to 2.8)		Yes (with others)	61	3.6 (1.4 to 9.4)	17
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Comments																							

<b>Bibliographic reference</b>	<b>Klonoff-Cohen and Edelstein (1995) Bed sharing and sudden infant death syndrome. BMJ (in CG37)</b>		
Study type and aim	<p>Case-control (standardised telephone interviews)</p> <p>Aim: to determine whether infants who died of sudden infant death syndrome routinely shared their parents' bed more commonly than control infants</p>		
Cases	<p>N=200</p> <p>Obtained from death certificates from five health departments in southern California. Had autopsy at death between Jan 1989 and Dec 1992</p> <p>Contacted by post 6 to 12mths after the death</p>		

Bibliographic reference	Klonoff-Cohen and Edelstein (1995) Bed sharing and sudden infant death syndrome. BMJ (in CG37)
	<p>Exclusion criteria:</p> <ul style="list-style-type: none"> <li>- Infants with respiratory problems, foetal distress, metabolic disturbances, morphological abnormalities</li> <li>- Multiple births</li> <li>- &gt;1yr</li> <li>- Adopted babies</li> <li>- Cases with no autopsy</li> </ul> <p>Preliminary analysis on 200 cases and 200 matched controls interviewed before the height of publicity in the US about sleep position</p>
Controls	<p>N=200</p> <p>Randomly selected (using a random number table and identification numbers) from all live births in southern California hospitals.</p> <p>Matched for same birth hospital, date of birth, sex, and race</p> <p>Control parents contacted 3 to 6mths after the case interview</p> <p>History of infant care practices (such as routine sleep position, illnesses, vaccinations, and breast feeding) obtained when the control baby was the same age as the index case</p>
Questionnaire/interview	<p>45 to 60min standardised telephone interview with case and control parents, provided details of;</p> <ul style="list-style-type: none"> <li>- Demographic information, obstetric history, information on labour and delivery, neonatal characteristics, parental life-style, family history of diseases, circumstances of death for cases</li> <li>- Routine place of sleeping for the infant (crib, carrycot, pram, cradle, swing, parents' or other person's bed, couch, floor, or other place)</li> <li>- Routine sleep position (stomach, back, or side, alternating between two positions, no usual position)</li> <li>- Regular use of an intercom; feeding history (exclusive breast feeding, formula milk, or both), frequency of feeding from birth</li> <li>- Passive smoking based on smoking by mother, father, live in adult, or daycare provider</li> <li>- Infant's birth weight, any medical condition at birth</li> </ul>
Location	USA
Outcomes measures and effect size	Bed sharing was defined as routinely sharing a bed with a specified person, including the mother, father, or other relative, or babysitter during the day or night

Bibliographic reference	Klonoff-Cohen and Edelstein (1995) Bed sharing and sudden infant death syndrome. BMJ (in CG37)										
	<p>Conditional logistic regression used to estimate independently the odds ratio, with simultaneous adjustment for potential confounders</p> <p><b>Results</b> Parents of infants who died were;</p> <ul style="list-style-type: none"> <li>- Younger; 26yrs vs 28yrs, <math>p &lt; 0.001</math></li> <li>- Lower education level for fathers; 12.5yrs vs 13.4yrs, <math>p &lt; 0.01</math></li> <li>- Less were married or living together; 63% vs 77%, <math>p &lt; 0.01</math></li> </ul> <p>No difference between cases and controls for those who received prenatal care (n=175 cases, n=185 controls) No difference between cases and controls in age (<math>\leq 20</math>yrs and <math>&gt; 20</math>yrs) in those who chose to bed-share and those where infants slept alone</p> <p>Cases had significantly lower birth weights that control; 3236g vs 3459g, <math>p &lt; 0.001</math></p> <p><b>Sleep location at time of death;</b> At time of death n=45 were bed sharing with a parent (n=35 sleeping together, n=4 sleeping in mother's arms) or babysitter During the day low birthweight case infants who later died were more likely to share a bed</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Routine bed sharing</th> <th style="text-align: left;">OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td>Unadjusted day</td> <td>1.52 (0.92 to 2.52)</td> </tr> <tr> <td>Unadjusted night</td> <td>1.28 (0.81 to 2.03)</td> </tr> <tr> <td>Adjusted day</td> <td>1.38 (0.59 to 3.22)</td> </tr> <tr> <td>Adjusted night</td> <td>1.21 (0.59 to 2.48)</td> </tr> </tbody> </table> <p>Adjusted for routine sleep position, passive smoking, breast feeding, use of intercom, maternal age and education, infant birth weight, and any medical condition at birth</p> <p>When maternal alcohol and recreational drug use were independently added to the model the odds ratio for bed sharing during the day and night remained virtually unchanged. There were no interactive effects between bed sharing and passive smoking, alcohol, or recreational drugs</p>	Routine bed sharing	OR (95%CI)	Unadjusted day	1.52 (0.92 to 2.52)	Unadjusted night	1.28 (0.81 to 2.03)	Adjusted day	1.38 (0.59 to 3.22)	Adjusted night	1.21 (0.59 to 2.48)
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Source of funding	Grants 1KT0038 and 2KT0063 from the University of California, Tobacco-Related Disease Research Programme										

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<b>Bibliographic reference</b>	<b>McGarvey et al (2006) An 8 year study of risk factors for SIDS: bed sharing versus non-bed-sharing. Arch Dis Child Matthews et al (2004) A multivariate “time based” analysis of SIDS risk factors. Arch Dis Child (details on the study methods taken from this paper)</b>
Study type and aim	Case-control (interviews at home) Aim: to evaluate the effects of bad sharing during the last sleep period on risk factors for SIDS
Cases	N=287 (287/332 cases, 86%) National SIDS register notified of all sudden unexpected infant deaths in Republic of Ireland, Jan 1994 to Dec 2001 SIDS defined as the sudden death of an infant which was unexpected by history and where a through postmortem exam failed to show an adequate cause of death – diagnosis accepted where this was used on the death certificate  Invited by letter to participate, home interview within 6wks of infant death
Controls	N=831 (831/966 controls approached, 86%) 4 control infants for each case Randomly selected for each case from the birth register Matched for DOB and the same community care areas as the index case  Invited by letter to participate, home interview within 6wks of case death
Questionnaire/interview	Interview collected data on: <ul style="list-style-type: none"> <li>- Sociodemographics, pregnancy</li> <li>- Infant’s medical history</li> <li>- Home environment</li> <li>- Current parenting practice,</li> <li>- Details of events surrounding the infants last 48hrs</li> <li>- Last sleep period</li> <li>- Death in the cases</li> </ul>
Location	Ireland

Bibliographic reference	McGarvey et al (2006) An 8 year study of risk factors for SIDS: bed sharing versus non-bed-sharing. Arch Dis Child Matthews et al (2004) A multivariate “time based” analysis of SIDS risk factors. Arch Dis Child (details on the study methods taken from this paper)																																																																				
Outcomes measures and effect size	<p>Co-sleeping during the last sleep defined as any shared sleeping arrangement of an infant with an adult in or on a bed/sofa/armchair</p> <p>Bed-sharing refers to infants sharing an adult bed with one or more adults</p> <p>Average age of cases 16.4wks, controls 21.8wks (univariate analysis related to last sleep was adjusted for this age difference)</p> <p>Multiple conditional logistic regression</p> <p>Information on co-sleeping during last sleep available for n=260 cases and n=829 controls</p> <p>(z scores for weight by gestation variable (multiples of standard deviations from the normal mean) was created by relating the birth weight of each baby to controls of similar gestation and included as a continuous variable)</p> <p><b>Results</b></p> <p><b>Bed-sharing:</b></p> <table border="1"> <thead> <tr> <th></th> <th>Cases (%)</th> <th>Controls (%)</th> <th>Univariate OR (95%CI)</th> <th>Multivariate OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td>Usual pattern – not bed-sharing</td> <td>118 (71%)</td> <td>780 (94%)</td> <td>Ref</td> <td>Ref</td> </tr> <tr> <td>Usual pattern – bed-sharing</td> <td>75 (29%)</td> <td>47 (6%)</td> <td>5.09 (1.86 to 13.92)</td> <td>5.20 (1.86 to 14.50)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last sleep period – no sharing</td> <td>121 (47%)</td> <td>728 (88%)</td> <td>Ref</td> <td>Ref</td> </tr> <tr> <td>Last sleep period – bed-sharing</td> <td>128 (49%)</td> <td>101 (12%)</td> <td>5.30 (2.29 to 12.24)</td> <td>3.53 (1.40 to 8.93)</td> </tr> <tr> <td>Last sleep period – co-sleeping (sofa/armchairs)</td> <td>11 (4%)</td> <td>0</td> <td>-</td> <td>-</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Next to 1 adult in bed</td> <td>76 (29%)</td> <td>60 (7%)</td> <td>4.94 (1.89 to 12.91)</td> <td>3.29 (1.05 to 10.26)</td> </tr> <tr> <td>Between 2 adults in bed</td> <td>44 (17%)</td> <td>39 (5%)</td> <td>5.20 (1.20 to 22.55)</td> <td>4.68 (1.09 to 19.99)</td> </tr> <tr> <td>Other*</td> <td>8 (4%)</td> <td>2 (0.2%)</td> <td>-</td> <td>-</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Bed-sharing (0 to 10wks)</td> <td>71 (28%)</td> <td>16 (2%)</td> <td>8.07 (2.24 to 29.03)</td> <td>8.02 (1.97 to 32.54)</td> </tr> </tbody> </table>					Cases (%)	Controls (%)	Univariate OR (95%CI)	Multivariate OR (95%CI)	Usual pattern – not bed-sharing	118 (71%)	780 (94%)	Ref	Ref	Usual pattern – bed-sharing	75 (29%)	47 (6%)	5.09 (1.86 to 13.92)	5.20 (1.86 to 14.50)						Last sleep period – no sharing	121 (47%)	728 (88%)	Ref	Ref	Last sleep period – bed-sharing	128 (49%)	101 (12%)	5.30 (2.29 to 12.24)	3.53 (1.40 to 8.93)	Last sleep period – co-sleeping (sofa/armchairs)	11 (4%)	0	-	-						Next to 1 adult in bed	76 (29%)	60 (7%)	4.94 (1.89 to 12.91)	3.29 (1.05 to 10.26)	Between 2 adults in bed	44 (17%)	39 (5%)	5.20 (1.20 to 22.55)	4.68 (1.09 to 19.99)	Other*	8 (4%)	2 (0.2%)	-	-						Bed-sharing (0 to 10wks)	71 (28%)	16 (2%)	8.07 (2.24 to 29.03)	8.02 (1.97 to 32.54)
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	Bed-sharing (10 to 20wks)	39 (15%)	36 (4%)	16.38 (2.95 to 90.69)	6.63 (0.95 to 45.81)																																
	Bed-sharing (21 to 52wks)	15 (6%)	36 (4%)	2.11 (0.40 to 11.11)	1.63 (0.27 to 10.00)																																
	Bed-sharing (>52wks)	2 (1%)	13 (2%)	0.78 (0.45 to 0.59)	0.42 (0.01 to 14.17)																																
	<p>Multivariate analysis adjusted for; maternal age, education, smoking, drinking, occurrence of urinary tract infection during pregnancy, social disadvantage, <math>\geq 3</math> previous live births, z scores for weight by gestation, resuscitation required at birth, male sex, whether breast feeding was initiated at birth, any history of illness during infant’s lifetime, baby prone to sweating, symptoms in 48hr prior to last/reference sleep, tog of clothing/bedding <math>\geq 10</math>, use of duvets, prone position, absence of routine soother use during last/reference sleep period</p> <p>OR for all univariate analysis adjusted for infant age at death/interview</p> <p>*other – cases found between mother and another child (n=3), at top of bed with older siblings, younger siblings at the bottom (n=1), baby down in middle/bottom of bed (n=2), next to one sibling 13yrs of age (n=1), or no information on location (n=1)</p> <p>Bed-sharing divided by wks adjusted for maternal smoking and social deprivation</p> <p><b>Interaction between bed-sharing and co-sleeping and other risk factors:</b></p> <table border="1"> <thead> <tr> <th>Interaction with bed-sharing</th> <th>Unadjusted OR (95%CI)</th> <th>Adjusted OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td>Placed prone for last sleep</td> <td>1.94 (0.19 to 18.89)</td> <td>-</td> </tr> <tr> <td>Mother smoker</td> <td>6.64 (2.29 to 19.24)</td> <td>6.35 (1.15 to 34.81)</td> </tr> <tr> <td>Social disadvantage (3-5)</td> <td>0.95 (0.34 to 2.67)</td> <td>-</td> </tr> <tr> <td>Z scores of weight for gestation at birth</td> <td>0.55 (0.35 to 0.88)</td> <td>0.37 (0.14 to 0.97)</td> </tr> <tr> <td>Breastfeeding initiated at birth</td> <td>0.42 (0.17 to 1.02)</td> <td></td> </tr> <tr> <td>History of symptoms/illness since birth</td> <td>0.46 (0.20 to 1.06)</td> <td>-</td> </tr> <tr> <td>Tog of clothing/bedding <math>\geq 10</math></td> <td>4.21 (1.68 to 10.55)</td> <td>6.14 (1.10 to 34.42)</td> </tr> <tr> <td>Duvets used for last sleep</td> <td>2.34 (0.89 to 6.118)</td> <td></td> </tr> <tr> <td>Pillows used for last sleep</td> <td>0.39 (0.09 to 1.72)</td> <td>-</td> </tr> <tr> <td>Parental alcohol consumption in last 24hr</td> <td>3.39 (1.00 to 11.51)</td> <td>0.39 (0.02 to 8.71)</td> </tr> </tbody> </table>				Interaction with bed-sharing	Unadjusted OR (95%CI)	Adjusted OR (95%CI)	Placed prone for last sleep	1.94 (0.19 to 18.89)	-	Mother smoker	6.64 (2.29 to 19.24)	6.35 (1.15 to 34.81)	Social disadvantage (3-5)	0.95 (0.34 to 2.67)	-	Z scores of weight for gestation at birth	0.55 (0.35 to 0.88)	0.37 (0.14 to 0.97)	Breastfeeding initiated at birth	0.42 (0.17 to 1.02)		History of symptoms/illness since birth	0.46 (0.20 to 1.06)	-	Tog of clothing/bedding $\geq 10$	4.21 (1.68 to 10.55)	6.14 (1.10 to 34.42)	Duvets used for last sleep	2.34 (0.89 to 6.118)		Pillows used for last sleep	0.39 (0.09 to 1.72)	-	Parental alcohol consumption in last 24hr	3.39 (1.00 to 11.51)	0.39 (0.02 to 8.71)
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	Absence of routine soother use for last sleep	1.40 (0.46 to 4.28)	-	
	<b>Interaction with co-sleeping</b>	<b>Unadjusted OR (95%CI)</b>	<b>Adjusted OR (95%CI)</b>	
	Placed prone for last sleep	2.38 (0.25 to 22.76)	-	
	Mother smoker	7.56 (2.62 to 21.8)	8.50 (1.57 to 45.99)	
	Social disadvantage (3-5)	0.94 (0.34 to 2.62)	-	
	Z scores of weight for gestation at birth	0.58 (0.36 to 0.92)	0.31 (0.12 to 0.79)	
	Breastfeeding initiated at birth	0.40 (0.17 to 0.96)	0.55 (0.13 to 2.36)	
	History of symptoms/illness since birth	0.41 (0.18 to 0.92)	0.31 (0.07 to 1.42)	
	Tog of clothing/bedding ≥10	2.23 (0.97 to 5.13)	3.17 (0.64 to 15.79)	
	Duvets used for last sleep	1.28 (0.52 to 3.11)		
	Pillows used for last sleep	0.24 (0.06 to 1.01)		
	Parental alcohol consumption in last 24hr	3.95 (1.19 to 13.07)	0.41 (0.02 to 8.95)	
	Absence of routine soother use for last sleep	1.69 (0.56 to 5.04)	-	
	Adjusted OR; adjusted for maternal age, smoking and drinking during pregnancy, social disadvantage, occurrence of UTI during pregnancy, infant z scores at birth, resuscitation at birth, male sex, breastfeeding initiated at birth, history of illness since birth, baby probe to sweating, symptoms/problems in 48hr prior to death and tog value of clothing and bedding ≥10, use of duvets, absence of routine soother use, placed prone during last sleep period			
	(Tog value and z scores – continuous variables)			
	<b>Bed-sharing stratified by maternal smoking, tog value and z scores:</b>			
	Stratification of tog values (<10 and ≥10) and z scores (< -0.81 scores in lowest quartile of data range and ≥ -0.81 scores in 2 <sup>nd</sup> , 3 <sup>rd</sup> , and 4 <sup>th</sup> quartiles):			
		Cases (%)	Controls (%)	OR for bed-sharing (95%CI)
	Mother smoker	109 (42%)	17 (2%)	13.87 (9.58 to 20.09)
	Mother non-smoker	17 (7%)	83 (10%)	2.09 (0.98 to 4.39)

<b>Bibliographic reference</b>	<b>McGarvey et al (2006) An 8 year study of risk factors for SIDS: bed sharing versus non-bed-sharing. Arch Dis Child Matthews et al (2004) A multivariate “time based” analysis of SIDS risk factors. Arch Dis Child (details on the study methods taken from this paper)</b>			
	Tog ≥10	102 (40%)	57 (7%)	9.68 (8.24 to 11.36)
	Tog <10	24 (9%)	44 (5%)	2.34 (1.12 to 4.95)
	z scores ≥ -0.81	57 (25%)	17 (2%)	16.28 (14.15 to 19.10)
	z scores < -0.81	56 (24%)	72 (10%)	4.90 (2.88 to 8.41)
Source of funding	Not reported (consider authors to have no competing interests)			
Comments				

<b>Bibliographic reference</b>	<b>Mitchell et al (1997) Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: a prospective study. Paediatrics</b>
Study type and aim	Case-control (based on routinely recorded data by community child health nurses) Aim: to monitor changes in the prevalence of the modifiable risk factors targeted by the prevention campaign and other risk factors and to ascertain if the risk factors or their magnitude changes as the prevalence of other risk factors changed
Cases	N=127 (127/232 SIDS cases, 55%) Data recorded on every infant by community child health nurses for all live births; Oct 1991 to Sept 1993. Data from SIDS cases Deaths registered by the NZ Health Information Service as attributable to SIDS in the post neonatal age group (after 28 completed days and within 1yr of life) Autopsy was not an essential part of the definition (98%, ie almost all deaths classed as SIDS have had an autopsy)  Sample was representative of all the births in New Zealand (sampling method; DOB randomly selected from all days in the study period, obstetric hospital randomly chosen in proportion to the no. of births, obstetric hospital with multiple births on nominated day DOB random numbers used to select a particular infant from those born on that day, a direction variable which indicates to either go forward or back in looking for a birth in the situation where the hospital did not have one on the nominated day
Controls	N=922 (922/1200 controls identified, 77%) Random sample of controls from the same data recorded by community child health nurses as for cases

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Questionnaire/interview	<p>Data on infant care practices recorded by the nurse at 2 time points – at first initial contact and at approx. 2mths of age;</p> <ul style="list-style-type: none"> <li>- Infant care practices in the previous 24hrs</li> <li>- Main type of infant feeding</li> <li>- Maternal and paternal smoking</li> <li>- Positions infants placed to sleep</li> <li>- Whether the mother fell asleep with the infant in the bed</li> </ul> <p>At initial contact also recorded;</p> <ul style="list-style-type: none"> <li>- Sociodemographic variables; marital status, age mother left school, age of mother, self-reported ethnicity of mother and father</li> <li>- Pregnancy factors; number of previous pregnancies, when ante natal care began, maternal smoking in pregnancy</li> <li>- Infant variables; date of birth, reported ethnicity of infant,, sex, birth weight, and gestation</li> <li>- Type of infant feeding at discharge from obstetric hospital</li> </ul>																								
Location	NZ																								
Outcomes measures and effect size	<p>Infants participating in the study did not differ from all live births in regards to weight, gestation and ethnicity Mothers in the study were more likely to be married, and not to have smoked in pregnancy The ages of the cases and controls were not significantly different at the initial visit (cases, mean(SD) 2.6wks (1.2); controls, 2.4wks (1.2) or at 2mths contact (cases, mean(SD) 9.1wks (1.9); controls, 9.2wks (2.2)</p> <p>Multivariate OR obtained from unconditional logistic regression modelling</p> <p><b>Results</b></p> <p><b>Variables related to the infant:</b></p> <table border="1" data-bbox="654 1129 1621 1401"> <thead> <tr> <th></th> <th>Cases (%)</th> <th>Controls (%)</th> <th>Univariate OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td>Birth weight</td> <td></td> <td></td> <td></td> </tr> <tr> <td>&lt;2500g</td> <td>15 (12.1%)</td> <td>47 (5.2%)</td> <td>4.07 (1.95 to 8.44)</td> </tr> <tr> <td>2500–2999g</td> <td>30 (24.2%)</td> <td>139 (15.3%)</td> <td>2.75 (1.57 to 4.83)</td> </tr> <tr> <td>3000–3499g</td> <td>46 (37.1%)</td> <td>302 (33.2%)</td> <td>1.94 (1.18 to 3.20)</td> </tr> <tr> <td>3500+g</td> <td>33 (26.6%)</td> <td>421 (46.3%)</td> <td>1.00</td> </tr> </tbody> </table>		Cases (%)	Controls (%)	Univariate OR (95%CI)	Birth weight				<2500g	15 (12.1%)	47 (5.2%)	4.07 (1.95 to 8.44)	2500–2999g	30 (24.2%)	139 (15.3%)	2.75 (1.57 to 4.83)	3000–3499g	46 (37.1%)	302 (33.2%)	1.94 (1.18 to 3.20)	3500+g	33 (26.6%)	421 (46.3%)	1.00
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	Gestation				
	<38wks	24 (19.7%)	84 (8.0%)	2.35 (1.38 to 3.98)	
	38+wks	98 (80.3%)	806 (92.0%)	1.00	
	<b>Postnatal factors:</b>				
		Cases (%)	Controls (%)	Univariate OR (95%CI)	
	Bed sharing (initial)				
	Yes	33 (28.2%)	167 (18.2%)	1.76 (1.11 to 2.78)	
	No	84 (71.8%)	749 (81.8%)	1.00	
	Bed sharing (2mths)				
	Yes	15 (24.2%)	90 (11.6%)	2.43 (1.24 to 4.69)	
	No	47 (75.8%)	684 (88.4%)	1.00	
	<b>Infant subgroups by bed sharing and maternal smoking:</b>				
		Maternal smoking	Cases (%)	Controls (%)	Univariate OR (95%CI)
	Bed sharing (initial)				
	No	No	32 (28.1%)	566 (63.0%)	1.00
	No	Yes	50 (43.9%)	171 (19.0%)	5.17 (3.13 to 8.55)
	Yes	No	5 (4.4%)	119 (13.2%)	0.74 (0.22 to 1.98)
	Yes	Yes	27 (23.7%)	43 (4.8%)	11.11 (5.85 to 21.10)
	Bed sharing (2mths)				
	No	No	18 (30.5%)	523 (68.9%)	1.00
	No	Yes	27 (23.7%)	149 (19.7%)	5.27 (2.71 to 10.28)

Bibliographic reference	Mitchell et al (1997) Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: a prospective study. Paediatrics						
	Yes	No	4 (6.8%)	61 (8.0%)	1.91 (0.45 to 6.04)		
	Yes	Yes	10 (16.9%)	25 (3.3%)	11.62 (4.46 to 30.08)		
	<b>Adjusted OR, bed sharing and maternal smoking:</b>						
	Bed sharing	Maternal smoking	OR (95%CI)* Initial	OR (95%CI)* 2mths			
	No	No	1.00	1.00			
	No	Yes	1.68 (0.84 to 3.34)	1.43 (0.58 to 3.51)			
	Yes	No	0.55 (0.17 to 1.78)	1.03 (0.21 to 5.06)			
	Yes	Yes	5.01 (2.01 to 12.46)	5.02 (1.05 to 24.05)			
	*controlling for; maternal age, marital status, age mother left school, previous number of pregnancies, infant's sex, ethnicity of infant, birthweight, sleep position, breastfeeding, bed sharing/maternal smoking combinations						
	<b>Population-attributable risk estimates (PAR):</b> (provides an estimate of the proportion of cases that can be attributed to the risk factor, assuming there is a causal relationship between the putative risk factor and death)						
			Initial			2mths	
			Prevalence	OR	PAR	Prevalence	OR
		Maternal smoking, but not bed sharing	19.0%	5.17	0.44	19.7%	5.27
		Maternal smoking and bed sharing	4.8%	11.11	0.33	3.3%	11.62
	Outcomes reported on univariate OR for sociodemography, variables related to pregnancy, sex, ethnicity, breastfeeding, maternal smoking, paternal smoking, sleep position (not reported in this ET)						
	Results also reported on variables related to sociodemography, pregnancy, infant sex and ethnicity not reported in this ET						
Source of funding	Cot Death Association and the Public Health Commission						
Comments	Multivariate OR obtained from unconditional logistic regression modelling Population-attributable risks (PARs) calculated to estimate the proportion of deaths explained by exposure to particular risk factors						

Bibliographic reference	Ruys et al (2007) Bed-sharing in the first four months of life: a risk factor for sudden infant death. Acta Paediatrica
Study type and aim	Case-control (interviews at home visits (cases), interviews in clinics (controls)) Aim: to determine the prevalence of bed-sharing, to investigate the risk of cot death during bed-sharing in the first half of the year (and to make recommendations for parents regarding bed-sharing)
Cases	N=138 Cot Death Committee (CDC) of the Dutch Paediatric Association monitors SIDS (SIDS defined as sudden, expected death of a child under 2yrs which is not fully explained by the observed paediatric and pathologic findings) Sept 1996 to Sept 2006 – limited to cases from 0 to 5mths (considered SIDS during bed-sharing to be exceptional after first half year of life)  Extensive parent interview by CDC and report of the circumstances of death. Interview at home within weeks, sometimes months
Controls	N=1628 Participated in a countrywide survey 'Safe sleep 1999' in 170 infant welfare centres, centres regularly attended by >95% of Dutch babies (these were distributed over 10 of 12 provinces, slight under-representation of the big cities) Same age  Survey – interview administered by the well-baby physicians to consecutive infants attending the clinic 93% had data on bed-sharing in the night before interview  No controls were <1mth as did not attend the centre that early
Questionnaire/interview	No additional data on interview content
Location	The Netherlands
Outcomes measures and effect size	Bed sharing defined as found co-sleeping with one or both parents when deceased – cases Bed sharing reported as bed-sharing in the previous night for at least part of the night – controls  Co-sleeping with infant on a sofa or chair was excluded from the study  Logistic regression model fitted to a subset of the data. First interactions removed from the model if associated $p > 0.10$ . to assess whether the relative risk associated with any risk factor could also be dependent on the status (value) of another risk factor the appropriate interaction term was added to the model and a likelihood ratio test performed

Bibliographic reference	Ruys et al (2007) Bed-sharing in the first four months of life: a risk factor for sudden infant death. Acta Paediatrica																																				
	<p><b>Results</b></p> <p><b>Prevalence of bed-sharing in the SIDS cases:</b> N=36/138 (25%) bed-shared during last night, of these n=8 were unaccustomed to this</p> <p><b>Estimated increased risk (OR) associated with bed-sharing during the last night with respect to breast feeding status;</b> Breast-feeding status at 1-5mths in cases</p> <table border="1"> <thead> <tr> <th></th> <th>1mth OR (95%CI)</th> <th>2mths OR (95%CI)</th> <th>3mths OR (95%CI)</th> <th>4-5mths OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td>Not adjusted for breast-feeding</td> <td>9.1 (4.2 to 19.4)</td> <td>4.0 (2.3 to 6.7)</td> <td>1.7 (0.9 to 3.4)</td> <td>1.3 (1.0 to 1.6)</td> </tr> <tr> <td>Adjusted for breast-feeding</td> <td>11 (5 to 24)</td> <td>4.9 (2.8 to 8.4)</td> <td>2.1 (1.1 to 4.2)</td> <td>0.9 (0.3 to 2.7)</td> </tr> </tbody> </table> <p>Control group adjusted for age and smoking by one or both parents</p> <p>Breastfeeding itself (continued to the last day) when OR adjusted for bed-sharing, smoking of parents, age of infant (OR 0.36 (0.22 to 0.61))</p> <p><b>Smoking split by bed-sharing;</b></p> <table border="1"> <thead> <tr> <th>Bed-sharing</th> <th>Smoking by parents</th> <th>OR (95%CI)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">No</td> <td>No</td> <td>1.0</td> </tr> <tr> <td>One parent</td> <td>2.3 (1.4 to 3.8)</td> </tr> <tr> <td>Both parents</td> <td>3.9 (2.3 to 6.6)</td> </tr> <tr> <td rowspan="3">Yes</td> <td>No</td> <td>1.0</td> </tr> <tr> <td>One parent</td> <td>2.4 (0.8 to 7.7)</td> </tr> <tr> <td>Both parents</td> <td>14.6 (4.6 to 46)</td> </tr> </tbody> </table> <p>Compared with control of the same age – estimation of the interaction between smoking and bed-sharing (p=0.07)</p>						1mth OR (95%CI)	2mths OR (95%CI)	3mths OR (95%CI)	4-5mths OR (95%CI)	Not adjusted for breast-feeding	9.1 (4.2 to 19.4)	4.0 (2.3 to 6.7)	1.7 (0.9 to 3.4)	1.3 (1.0 to 1.6)	Adjusted for breast-feeding	11 (5 to 24)	4.9 (2.8 to 8.4)	2.1 (1.1 to 4.2)	0.9 (0.3 to 2.7)	Bed-sharing	Smoking by parents	OR (95%CI)	No	No	1.0	One parent	2.3 (1.4 to 3.8)	Both parents	3.9 (2.3 to 6.6)	Yes	No	1.0	One parent	2.4 (0.8 to 7.7)	Both parents	14.6 (4.6 to 46)
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<b>Bibliographic reference</b>	<b>Tappin et al (2005) Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: a case-control study. The Journal of Pediatrics (in CG37)</b>
Study type and aim	Case-control (questionnaire based interviews at home visits) Aim: to consider used infant mattresses and SIDS and to consider bedsharing with an infant and association with SIDS
Cases	N=131 initially (84% of the identified cases) N=123 cases used (some cases re-classified) Health boards in Scotland (Jan 1996 to May 2000) Pathologist notification of all unexplained infant deaths that history, death scene investigation and post-mortem failed to explain. Standard necropsy protocol with agreed diagnostic criteria used to provide consistent classification, 94% of cases examined by an expert paediatric pathologist  Home visit interviews within 28days of death
Controls	N=278 (90% of the control parents interviewed by the 28day point) N=263 controls used (some cases re-classified)  2 controls for each case The births immediately before and after in the same maternity unit No other matching was used
Questionnaire/interview	Questionnaire including; <ul style="list-style-type: none"> <li>- Core medical and social data</li> <li>- Infant care practices used routinely and for the night before interview for controls/night of death for cases (last sleep)</li> <li>- Socioeconomic status; 7 individual factors (mother's marital status, mother living alone, mother and father currently employed, age parents left full-time education, mother in paid employment before the infant's birth) and one measure (Deprivation Category, DEPCAT)</li> <li>- Exposure to smoking</li> <li>- Roomsharing</li> <li>- Normal sleep place (cot, carrycot, pram, crib, moses basket, parent's bed, other)</li> <li>- Sharing a sleep surface during last sleep; where (bed, couch, chair); how long (&lt;2hrs, 2-5hrs, &gt;5hrs); with whom; how</li> </ul>

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	Bed-sharing <2hrs	6% (n=7)	2% (n=5)	11.06 (2.04 to 60.13)	29.15 (3.62 to 235)
	Bed-sharing 2-5hrs	12% (n=15)	6% (n=16)	7.38 (2.39 to 22.7)	2.97 (0.48 to 18.6)
	Bed-sharing >5hrs	15% (n=18)	5% (n=13)	11.06 (3.49 to 35)	13.92 (2.80 to 69)
	Outside edge 1 parent	6% (n=7)	4% (n=10)	5.53 (1.39 to 22)	7.63 (1.27 to 46)
	Outside edge 2/3 people	12% (n=15)	4% (n=10)	11.06 (3.14 to 39)	7.06 (1.16 to 43)
	Between 2/3 people	14% (n=17)	3% (n=8)	17.21 (4.40 to 67)	28.64 (4.17 to 197)
	*multivariate model included: maternal age, quadratic function of maternal age, birth weight, infant age, parity, either parent smoked, laid prone to sleep, laid side on to sleep, found with head covered in the past, found with head covered after last sleep, infant routinely slept on a used infant mattress				
	<b>Interaction between bed-sharing and other factors:</b>				
	Bedsharing infants in this case – includes infants who spent most of the last sleep in room with parents and bed-shared for some/all of last sleep				
	<b>Risk factor</b>	<b>Cases mean(SD)</b>	<b>Controls mean(SD)</b>	<b>Interaction with bed-sharing; Multivariate model*</b>	<b>P value</b>
	Birth weight (kg)	2.89 (0.65)	3.39 (0.56)	0.67 (0.18 to 2.47)	0.545
	Maternal age (yrs)	25.2 (5.8)	28.9 (5.7)	1.00 (0.88 to 1.14)	0.975
	Quadratic function of maternal age			1.01 (0.99 to 1.03)	0.356
	Infant age (wks)	13.6 (9.5)	16.6 (9.3)	0.88 (0.78 to 0.99)	0.035
	Infant age (wks) controlled for gestation	12.0 (10.1)	16.1 (9.4)	0.88 (0.78 to 1.00)	0.042
	Parity	2.34 (1.3)	1.81 (1.0)	0.76 (0.40 to 1.42)	0.388
		<b>Cases No.(%)</b>	<b>Controls No.(%)</b>		
	Found in past with head covered	6 (5%)	10 (4%)	0.15 (0.02 to 1.32)	0.088
	Found after last sleep head covered	3 (2%)	2 (1%)	0.09 (0.00 to 1.99)	0.128
	Routine used infant mattress	22 (18%)	22 (8%)	0.26 (0.05 to 1.30)	0.101
	Placed prone last sleep	1 (1%)	3 (1%)	0.34 (0.00 to 115)	0.715

Bibliographic reference	<b>Tappin et al (2005) Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: a case-control study. The Journal of Pediatrics (in CG37)</b>				
	Placed on side last sleep	12 (10%)	10 (4%)	0.60 (0.11 to 3.20)	0.550
	Either parent smoked	36 (29%)	17 (6%)	5.89 (0.74 to 47)	0.094
	Mother smoked	32 (26%)	15 (6%)	1.75 (0.34 to 9.13)	0.505
	<p>*multivariate model included; maternal age, quadratic function of maternal age, birth weight, infant age, parity, either parent smoked, laid prone to sleep, laid on side to sleep, found with head covered in the past, found with head covered after last sleep, infant routinely slept on a used infant mattress</p> <p>Breast-feeding; N=16 cases who bed-shared for some time during their last sleep were breast-fed (all &lt;11wks), bed-sharing and breast-feeding, OR (95%CI) 13.10 (1.29 to 133)</p>				
Source of funding	Not reported				
Comments					

Bibliographic reference	<b>Vennemann et al (2009) Sleep environment risk factors for sudden infant death syndrome: the German sudden infant death syndrome study. Pediatrics</b>				
Study type and aim	<p>Case-control (questionnaire based interviews at home visits)</p> <p>Aim: to investigate the risk factors for sudden infant death syndrome in the infants' sleep environment for a population in which few infants sleep prone as a result of education campaigns</p>				
Cases	<p>N=333 (response rate of cases 82.4%)</p> <p>Population-based case-control, 1998-2001, GeSID study in an area of Germany where approx. 50% of births occur</p> <p>All cases autopsied by forensic pathologists using a standardised protocol including histology, microbiology, virology, toxicology, and neuropathology. Multidisciplinary panel decided whether the case was SIDS or an explained case of sudden death in infancy</p>				
Controls	<p>N=998 (response rate of controls 58.7%)</p> <p>Matched for age, gender, religion, and sleep time</p>				

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	<p>Recruited from the same vital registration office the case was registered with Born 4-6wks after each case infant, so once interviews completed had the same age as the index case (<math>\pm 2</math>wks)</p> <p>Reference sleep determined from the likely time of death, morning sleep, afternoon sleep, evening sleep or night sleep of the cases</p>																																																
Questionnaire/interview	<p>Detailed questionnaire filled in with parents by a trained interviewer, same sleep environment questions for cases and controls;</p> <ul style="list-style-type: none"> <li>- Sleep environment (same questions for cases and controls)</li> <li>- Previous illnesses of the child</li> <li>- Feeding of the infant</li> <li>- Previous sleep arrangements</li> <li>- Sleep environment last sleep (cases), reference sleep (controls)</li> </ul>																																																
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Outcomes measures and effect size	<p>Univariate and multivariate analyses using conditional logistic regression</p> <p><b>Results</b> <b>Sleep environment during last sleep/reference sleep:</b></p> <table border="1"> <thead> <tr> <th></th> <th>Cases (%)</th> <th>Controls (%)</th> <th>Univariate OR (95%CI)</th> <th>Multivariate OR* (95%CI)</th> </tr> </thead> <tbody> <tr> <td colspan="5"><b>Bed</b></td> </tr> <tr> <td>Own bed</td> <td>221 (66.4%)</td> <td>735 (73.7%)</td> <td>1.00</td> <td>1.00</td> </tr> <tr> <td>Bed with siblings</td> <td>4 (1.2%)</td> <td>2 (0.2%)</td> <td>6.68 (1.21 to 36.69)</td> <td>1.12 (0.03 to 37.26)</td> </tr> <tr> <td>Parental bed</td> <td>42 (12.6%)</td> <td>74 (7.4%)</td> <td>2.02 (1.31 to 3.13)</td> <td>2.81 (0.81 to 9.75)</td> </tr> <tr> <td>Sofa</td> <td>14 (4.2%)</td> <td>13 (1.3%)</td> <td>3.61 (1.65 to 7.87)</td> <td>3.69 (0.86 to 15.84)</td> </tr> <tr> <td>Other</td> <td>28 (8.4%)</td> <td>90 (9.0%)</td> <td>1.08 (0.69 to 1.71)</td> <td>1.85 (0.78 to 4.37)</td> </tr> <tr> <td colspan="5"><b>Bed sharing during last sleep</b></td> </tr> <tr> <td>No</td> <td>285 (85.6%)</td> <td>909 (91.1%)</td> <td>1.00</td> <td>1.00</td> </tr> </tbody> </table>					Cases (%)	Controls (%)	Univariate OR (95%CI)	Multivariate OR* (95%CI)	<b>Bed</b>					Own bed	221 (66.4%)	735 (73.7%)	1.00	1.00	Bed with siblings	4 (1.2%)	2 (0.2%)	6.68 (1.21 to 36.69)	1.12 (0.03 to 37.26)	Parental bed	42 (12.6%)	74 (7.4%)	2.02 (1.31 to 3.13)	2.81 (0.81 to 9.75)	Sofa	14 (4.2%)	13 (1.3%)	3.61 (1.65 to 7.87)	3.69 (0.86 to 15.84)	Other	28 (8.4%)	90 (9.0%)	1.08 (0.69 to 1.71)	1.85 (0.78 to 4.37)	<b>Bed sharing during last sleep</b>					No	285 (85.6%)	909 (91.1%)	1.00	1.00
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	Yes	48 (14.4%)	89 (8.9%)	1.80 (1.21 to 2.66)	2.73 (1.34 to 5.55)
	* adjusted for sleep position, breastfeeding, maternal smoking in pregnancy, family status, SES, maternal age at delivery, previous live birth, birth weight, extra heating of infant. Other factors in multivariate model; home, room infant slept in, position placed to sleep, position found, pacifier use, bedding during last sleep, pillow used during last sleep, sheepskin used, waterproof layer under infant				
	<b>Sleep environment during the last 4wks:</b>				
		Cases (%)	Controls (%)	Univariate OR (95%CI)	Multivariate OR* (95%CI)_
	Bed				
	Own bed	234 (73.2%)	733 (73.5%)	1.00	1.00
	Bed with siblings	6 (1.8%)	3 (0.3%)	5.96 (1.48 to 23.98)	0.76 (0.09 to 6.40)
	Carriage	16 (4.8%)	67 (6.7%)	0.67 (0.36 to 1.25)	1.10 (0.36 to 3.37)
	Parental bed	26 (7.8%)	67 (6.7%)	1.21 (0.74 to 1.99)	0.76 (0.26 to 2.17)
	Sofa	5 (1.5%)	15 (1.5%)	1.02 (0.36 to 2.87)	1.87 (0.28 to 12.15)
	Other	36 (10.8%)	112 (11.2%)	0.96 (0.64 to 1.47)	1.35 (0.69 to 2.68)
	How often infant taken into parental bed				
	Never	184 (55.8%)	630 (63.2%)	1.00	1.00
	Sometimes every night	146(44.2%)	367 (36.8%)	1.41 (1.08 to 1.82)_	1.08 (0.61 to 1.66)
	* adjusted for sleep position, breastfeeding, maternal smoking in pregnancy, family status, SES, maternal age at delivery, previous live birth, birth weight, extra heating of infant. Other factors in multivariate model; home, room infant slept in, position placed to sleep, position found, pacifier use, bedding during last sleep, pillow used during last sleep, sheepskin used, waterproof layer under infant				
Source of funding	German Federal Ministry for Science and Education				
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