

Postnatal care

[M] Benefits and harms of bed sharing

NICE guideline NG194

Evidence review underpinning recommendations 1.3.13 to 1.3.14

April 2021

Final

These evidence reviews were developed by the National Guideline Alliance, part of the Royal College of Obstetricians and Gynaecologists

Disclaimer

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

NICE guidelines cover health and care in England. Decisions on how they apply in other UK countries are made by ministers in the [Welsh Government](#), [Scottish Government](#), and [Northern Ireland Executive](#). All NICE guidance is subject to regular review and may be updated or withdrawn.

Copyright

© NICE 2021. All rights reserved. Subject to [Notice of Rights](#).

ISBN: 978-1-4731-4078-3

Contents

Benefits and harms of bed sharing.....	6
Review question	6
Introduction	6
Summary of the protocol	6
Methods and process	6
Clinical evidence	7
Summary of clinical studies included in the evidence review	8
Quality assessment of clinical studies included in the evidence review	11
Economic evidence	11
Economic model.....	11
Evidence statements	11
The committee’s discussion of the evidence.....	15
References	18
Appendices.....	20
Appendix A – Review protocol.....	20
Review protocol for review question: What are the benefits and harms of co- sleeping?	20
Appendix B – Literature search strategies	26
Literature search strategies for review question: What are the benefits and harms of co-sleeping?.....	26
Appendix C – Clinical evidence study selection	30
Clinical study selection for: What are the benefits and harms of co-sleeping?	30
Appendix D – Clinical evidence tables	31
Clinical evidence tables for review question: What are the benefits and harms of co-sleeping?.....	31
Appendix E – Forest plots.....	66
Forest plots for review question: What are the benefits and harms of co- sleeping?	66
Appendix F – GRADE tables	67
GRADE tables for review question: What are the benefits and harms of co- sleeping?	67
Appendix G – Economic evidence study selection.....	80
Economic evidence study selection for review question: What are the benefits and harms of co-sleeping?	80
Appendix H – Economic evidence tables.....	81
Economic evidence tables for the review question: What are the benefits and harms of co-sleeping?.....	81
Appendix I – Economic evidence profiles	82

Economic evidence profiles for the review question: What are the benefits and harms of co-sleeping?	82
Appendix J – Economic analysis	83
Economic analysis for the review question: What are the benefits and harms of co-sleeping?	83
Appendix K – Excluded studies	84
Excluded studies for review question: What are the benefits and harms of co-sleeping?	84
Clinical studies	84
Economic studies	92
Appendix L – Research recommendations	93
Research recommendations for review question: What are the benefits and harms of co-sleeping?	93

Benefits and harms of bed sharing

Review question

What are the benefits and harms of co-sleeping?

Introduction

Parents sharing a bed with their infants is common practice throughout the world and in England. Sometimes it is a choice and at other times may happen when parents are fatigued after evening or night time feeds. The aim of this review is to find out what are the benefits and harms of co-sleeping or sharing a bed with a baby.

Summary of the protocol

Please see Table 1 for a revised summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	Parents or carers who have a healthy baby
Intervention	Co-sleeping with the baby on a shared sleep surface within the first 8 weeks after birth, whether intentional or unintentional. Shared sleep surfaces include but are not limited to the parents' bed, the use of a side-car cot or crib, a pepi-pod, a sofa or armchair.
Comparison	<ul style="list-style-type: none">• Baby sleeps in a cot or Moses style basket in the same room or separate room• One of the other interventions
Outcomes	<p>Critical:</p> <ul style="list-style-type: none">• infant mortality within the first year• proportion of women breastfeeding (exclusively or partially) at 6 weeks, 12 weeks and 6 months after the birth• emotional attachment between parent and baby when the baby is 12 to 18 months of age. <p>Important:</p> <ul style="list-style-type: none">• mother's satisfaction with own sleep in the first 8 weeks after the birth• serious illness in the baby, for example infection within the first 3 months• parental emotional health and wellbeing in the first 8 weeks after the birth• parental satisfaction.

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in [Developing NICE guidelines: the manual 2014](#). Methods specific to this review question are described in the review protocol in appendix A.

Declarations of interest were recorded according to NICE's 2014 conflicts of interest policy until March 2018. From April 2018 until June 2019, declarations of interest were recorded according to NICE's 2018 conflicts of interest policy. From July 2019

onwards, the declarations of interest were recorded according to NICE's 2019 [conflicts of interest policy](#). Those interests declared before July 2019 were reclassified according to NICE's 2019 conflicts of interest policy (see Register of Interests).

Clinical evidence

Included studies

Twelve studies were included in this review: 3 randomised controlled trials (RCTs) (Ball 2006; Ball 2011; Moon 2017), 1 RCT follow-up study (Ball 2016), 7 observational studies (Ball 2012; Blair 2010; Brenner 2003; Broussard 2012; Luijk 2013; McCoy 2004; Smith 2016) and 1 observational follow-up study (Mileva-Seitz 2016).

Eleven studies (Ball 2011; Ball 2012; Ball 2016; Blair 2010; Brenner 2003; Broussard 2012; Luijk 2013; McCoy 2004; Mileva-Seitz 2016; Smith 2016) compared shared sleep surface to no shared sleep surface. One study (Ball 2006) was a 3-way comparison of shared sleep surface (bed sharing), another shared sleep surface (side-car crib), and no shared sleep surface (stand-alone bassinette).

While RCT evidence was initially prioritised, the RCT evidence did not include data on all critical outcomes and was thus considered an insufficient basis on which to draft recommendations in this area, so observational studies were also used to inform decision making.

All RCTs were designed to select healthy women at low medical risk, who were expected to have a singleton, healthy, term baby and were intending to breastfeed. One RCT (Ball 2006) only recruited first-time mothers who delivered vaginally whereas the other RCTs (Ball 2011; Ball 2016; Moon 2017) were not similarly restricted. All observational studies included women who were due to give birth, only 2 of the studies (Brenner 2003; Broussard 2012) restricted the inclusion criteria to singleton babies.

In 5 of the observational studies (Ball 2012; Brenner 2003; Broussard 2012; Luijk 2013; McCoy 2004) bed sharing (the exposure of interest for this review) was considered to be the outcome and for example breastfeeding (the outcome of interest for this review) to be the exposure. That is, the relationship between the two variables (exposure and outcome) were analysed opposite to that pre-defined in the protocol for this review. This evidence was still included as it represented an association between the two variables of interest for this review.

No meta-analysis was carried out for studies comparing a shared sleep surface to no shared sleep surface, as studies differed in design, not all outcomes were collected at the same time point, and the exposure and outcome were inverse in some studies as explained previously.

The included studies are summarised in Table 2.

See the literature search strategy in appendix B and also the study selection flow chart in appendix C.

Excluded studies

Studies not included in this review with reasons for their exclusion are provided in appendix K.

Summary of clinical studies included in the evidence review

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of clinical studies included in the evidence review

Study	Population	Intervention and Comparison	Outcomes
RCTs			
Ball 2006 Single-centre non-blinded parallel RCT UK	N=61 Mother's bed, n= 18; Side-car crib, n= 23; Stand-alone cot, n= 20 Healthy, non-smoking first-time mothers, pregnant with a single infant, anticipating a normal vaginal delivery and intending to breastfeed.	Mother's bed versus sidecar crib versus standalone cot	<ul style="list-style-type: none"> Maternal satisfaction Adverse events (not defined)
Moon 2017* Single-centre single-blinded parallel RCT US	N=1,194 Baseline characteristics not reported per arm English-speaking, self-identified African-American women who had just delivered an infant.	Bed sharing versus room sharing without bed sharing	<ul style="list-style-type: none"> Partial breastfeeding at 2-3 months and 5-6 months Exclusive breastfeeding at 2-3 months and 5-6 months
Ball 2011 Single-centre non-blinded parallel RCT UK	N=870 Sidecar crib n=433; Standalone cot n=437 Normal singleton pregnancy; intention to deliver at hospital; and had not decided against breastfeeding.	Sidecar crib versus standalone cot	<ul style="list-style-type: none"> Any breastfeeding at 6, 12, and 26 weeks Exclusive breastfeeding at 6, 12, and 26 weeks Adverse events (not defined)
Ball 2016** See Ball 2011 for full study details	N=870 Bed sharing category: Rare/never n=299; Intermittent n=192; Often n=187; Poor response n=192. See NECOT trial (Ball 2011 for full study details)	Often bed shared versus rarely bed shared	<ul style="list-style-type: none"> Any breastfeeding at 6, 12, and 25 weeks Exclusive breastfeeding at 6, 12, and 25 weeks
Observational studies			
Ball 2012***	N=668	Breastfeeding at 1 to <8 weeks and ≥8	<ul style="list-style-type: none"> Regular bed-share

Study	Population	Intervention and Comparison	Outcomes
Prospective cohort study UK	Regular bed-share n=143; Ever bed-share n=310; Ever sofa-share n=188; Ever bed-share and ever sofa-share n=27 White British and Pakistani women who gave birth at the Bradford Royal Infirmary; singleton birth.	weeks versus never breastfed or breastfed for <1 week	
Blair 2010 Prospective population-based cohort study UK	N=14,062 (n=7,447 data available for all study time points) Early bed sharing n=968; late bed sharing n=112; constant bed sharing n=447; no bed sharing n=4915; Infants of all pregnant women who were residing in the 3 Bristol-based health districts of the county of Avon	Early bed sharing (only in first year), Late bed sharing (after the first year), or constant bed sharing (throughout 4 years) versus no bed sharing	<ul style="list-style-type: none"> Breastfeeding at 12 months
Brenner 2003*** Prospective birth cohort study US	Total mothers N=452 (n=394 eligible mothers completed first follow-up interview; n=369 eligible mothers completed second follow-up interview) Usual bed sharing n=178; no usual bed sharing n=191 Mothers with singleton births, giving birth at 3 hospitals in the District of Columbia.	<ul style="list-style-type: none"> Maternal depression versus no maternal depression at 3 to 7 months 	<ul style="list-style-type: none"> Usual bed sharing
Broussard 2012*** Prospective population-based cohort study USA	Total women n=2791 (n=1344 Black women; n=1447 White women) Never/rare bed sharing n=445 (black women); n=904 (white women); Frequent bed sharing n=899 (black women); n=543 (white women)	<ul style="list-style-type: none"> Breastfeeding versus no breastfeeding at ≤4 weeks Breastfeeding versus no breastfeeding at >4 weeks Parent-associated stress versus no parent-associated stress 	<ul style="list-style-type: none"> Frequent bed sharing

Study	Population	Intervention and Comparison	Outcomes
	Women resident in Florida and giving birth to a live born infant.		
Luijk 2013*** Prospective population-based cohort study The Netherlands	Total children n=6309 (n=5095 at 2 months; n=5361 at 24 months) No bed sharing n=1149; bed sharing n=3946 Pregnant women living in Rotterdam	<ul style="list-style-type: none"> Breastfeeding versus no breastfeeding at 2 months Maternal depressive symptoms versus no maternal depressive symptom at 2 months 	<ul style="list-style-type: none"> Bed sharing at 2 months
McCoy 2004*** Prospective multicentre cohort study US	Total mother-infant pairs N= 15 113 (data available for all three follow-up periods n=10 355 mother-infant pairs) Bed sharing at 3 months n=1450; at 6 months n=1346; no bed sharing at 3 months n=8905; 6 months n=9009 Mothers of newborn infants	Breastfeeding versus no breastfeeding at 3 and 6 months	<ul style="list-style-type: none"> Bed sharing
Mileva-Seitz 2016 Follow-up study of a cohort study The Netherlands	Total mothers N=552 Frequent bed-sharing n= 67; Some bed-sharing n= 178; Solitary sleeping n= 307 Children of Dutch national origin	Some bed-sharing (between once a month and up to 3 times a week) or frequent bed-sharing (4 times a week) versus never bed shared (solitary sleepers),	<ul style="list-style-type: none"> Insecure or secure attachment Disorganised or non-disorganised attachment
Smith 2016 Prospective cohort study US	Total mothers N=3983 (n=3297 mothers completed follow-up survey; n=3218 responded to the questions required for the study) Bed sharing n=686; no bed sharing n=2523	Bed sharing whole or part of the night versus room share without bed sharing	<ul style="list-style-type: none"> Exclusive breastfeeding or partial breast milk in past 2 weeks

Study	Population	Intervention and Comparison	Outcomes
	Mothers who spoke English or Spanish and were living in the US		

* Study did not randomise to bed sharing or no bed sharing, therefore study is assessed as an observational study

** Same population of women as Ball 2011. Ball 2016 compares often bed sharing versus rarely bed sharing as opposed to side car crib versus standalone cot in Ball 2011.

*** Exposure and outcome inverse to the protocol

RCT: randomised controlled trial; SD: standard deviation; SES: socioeconomic status.

See the full evidence tables in appendix D and the forest plots in appendix E.

Quality assessment of clinical studies included in the evidence review

See clinical evidence profiles in appendix F.

Economic evidence

Included studies

A single economic search was undertaken for all topics included in the scope of this guideline but no economic studies were identified which were applicable to this review question. See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

No economic studies were reviewed at full text and excluded from this review.

Economic model

No economic modelling was conducted for this review question because the committee agreed that other topics were higher priorities for economic evaluation.

Evidence statements

Clinical evidence statements

Comparison 1: Shared sleep surface versus no shared sleep surface

Critical outcomes

Infant mortality within the first year

- No evidence was identified for this outcome.

Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months

RCTs

- Very low quality evidence from 1 RCT (N=870) showed no clinically important difference in the proportion of women breastfeeding exclusively at 6 weeks, 12

weeks, and 6 months between women who bed shared compared to those who did not.

- Very low quality evidence from a follow-up study of an RCT (N=486) showed a clinically important increase in the proportion of women breastfeeding exclusively at 6 weeks and 12 weeks between women who often bed shared compared to those who rarely bed shared, but no clinically important difference at 6 months.

Observational studies

There was limited observational evidence available for this critical outcome at the time points stated in the protocol. However, evidence was available for proportion of women breastfeeding (exclusively) in the past 2 weeks and at 5-6 months.

- Very low quality evidence from 1 prospective cohort study (N=2,838) showed a clinically important increase in the proportion of women breastfeeding exclusively in the past 2 weeks between women bed sharing whole or part of the night versus room sharing without bed sharing.
- Very low quality evidence from 1 RCT (N=528) that was assessed as an observational study showed a clinically important increase in the proportion of women breastfeeding exclusively at 5-6 months between women bed sharing versus room sharing without bed sharing.

Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months

RCTs

- Very low quality evidence from 1 RCT (N=870) showed no clinically important difference in the proportion of women breastfeeding partially at 6 weeks, 12 weeks, and 6 months between women who bed shared compared to those who did not.
- Very low quality evidence from a follow-up study of an RCT (N=486) showed a clinically important increase in the proportion of women breastfeeding partially at 6 weeks, 12 weeks, and 6 months between women who often bed shared compared to those who rarely bed shared.

Observational studies

There was limited observational evidence available for this critical outcome at the time points stated in the protocol. However, evidence was available for proportion of women breastfeeding (partially) in the past 2 weeks and at 5-6 months.

- Very low quality evidence from 1 prospective cohort study (N=2,838) showed a clinically important increase in the proportion of women breastfeeding partially in the past 2 weeks between women bed sharing whole or part of the night versus room sharing without bed sharing.
- Very low quality evidence from 1 RCT (N=528) that was assessed as an observational study showed no clinically important difference in the proportion of women breastfeeding partially at 5-6 months between women bed sharing versus room sharing without bed sharing.

Proportion of women breastfeeding (any) at 6 weeks, 12 weeks and 6 months

Observational studies

There was limited observational evidence available for this critical outcome at the time points stated in the protocol. However, evidence was available for proportion of women breastfeeding (any) at 12 months.

- Very low quality evidence from 1 prospective population based cohort study (N=7,447) showed a clinically important increase in the proportion of women breastfeeding at 12 months between women who late bed shared defined as bed sharing after the first year, early bed shared defined as bed sharing only in the first year, and constant bed shared defined as bed sharing throughout 4 years compared to those who did not.
- Very low quality evidence from 1 prospective population based cohort study (N=1,510) showed a clinically important increase in frequent bed sharing between women breastfeeding for 4 weeks or less compared women not breastfeeding.
- Very low quality evidence from 1 prospective population based cohort study (n=2,133) showed a clinically important increase in frequent bed sharing between women breastfeeding for more than 4 weeks compared to women not breastfeeding.
- Very low quality evidence from 1 prospective cohort study (N=143) showed no clinically important difference in regular bed sharing between women breastfeeding for 1 to less than 8 weeks compared to women not breastfeeding or breastfed for less than 1 week.
- Very low quality evidence from 1 prospective cohort study (N=143) showed a clinically important increase in regular bed sharing between women breastfeeding for 8 weeks or more compared to women not breastfeeding.
- Very low quality evidence from 1 prospective population based cohort study (N=816) showed a clinically important increase in bed sharing between women breastfeeding at 2 months compared to women not breastfeeding.
- Very low quality evidence from 1 prospective multicentre cohort study (N=189) showed a clinically important increase in bed sharing at 3 months between women breastfeeding compared to women not breastfeeding.
- Very low quality evidence from 1 prospective multicentre cohort study (N=161) showed a clinically important increase in bed sharing at 6 months between women breastfeeding compared to women not breastfeeding.

Emotional attachment between parent and baby when the baby is 12 to 18 months of age

Observational studies

- Very low quality evidence from 1 follow-up study of a cohort study (N=552) showed a clinically important difference in attachment security (secure versus insecure attachment) among solitary sleeping infants at 14 months, with greater odds that insecurely attached infants would be solitary sleepers.
- Very low quality evidence from 1 follow-up study of a cohort study (N=552) showed a clinically important difference in attachment security (disorganised versus non-disorganised attachment) among solitary sleeping infants at 14 months, with greater odds that disorganised infants would be solitary sleepers.
- Very low quality evidence from 1 follow-up study of a cohort study (N=552) showed a clinically important difference in attachment security (secure versus insecure attachment) among infants who sometimes bed shared at 14 months, with greater odds that secure infants sometimes bed shared, but no clinically important difference among infants who frequently bed shared.
- Very low quality evidence from 1 follow-up study of a cohort study (N=552) showed no clinically important difference in attachment security (disorganised

versus non-disorganised) among infants who sometimes or frequently bed shared at 14 months.

Important outcomes

Mother's satisfaction with own sleep in the first 8 weeks after the birth

No evidence was identified for this outcome.

Serious illness in the baby

RCTs

- Very low quality evidence from 2 RCTs (N=931) showed no clinically important difference in adverse events (not defined) between babies whose mothers bed shared compared to those who did not.

Parental emotional health and wellbeing in the first 8 weeks after the birth

Observational studies

- Very low quality evidence from 1 prospective birth cohort study (N=394) showed a clinically important increase in usual bed sharing at ages 3 to 7 months between women with higher depression scores compared to those with lower depression scores.
- Very low quality evidence from 1 prospective population based cohort study (N=816) showed no clinically important difference in bed sharing at 2 months between women with depression and women without depression.
- Very low quality evidence from 1 prospective population based cohort study (N=2,791) showed a clinically important increase in usual bed sharing between women with partner-associated stress compared to those without partner-associated stress.

Parental satisfaction

RCTs

- Very low quality evidence from 1 RCT (N=61) showed no clinically important difference in maternal satisfaction (scale not reported) between women who bed shared compared to those who did not.

Comparison 2: Shared sleep surface versus another shared sleep surface

Critical outcomes

Infant mortality within the first year

No evidence was identified for this outcome.

Proportion of women breastfeeding (exclusively or partially) at 6 weeks, 12 weeks and 6 months

No evidence was identified for this outcome.

Emotional attachment between parent and baby when the baby is 12 to 18 months of age

No evidence was identified for this outcome.

Important outcomes

Mother's satisfaction with own sleep in the first 8 weeks after the birth

No evidence was identified for this outcome.

Serious illness in the baby

- Low quality evidence from 1 RCT (N=41) showed no clinically important difference in adverse events (not defined) between babies whose mothers bed shared compared to those who slept in a side-car crib.

Parental emotional health and wellbeing in the first 8 weeks after the birth

No evidence was identified for this outcome.

Parental satisfaction

- Very low quality evidence from 1 RCT (N=41) showed no clinically important difference in maternal satisfaction (scale not reported) between women who shared their bed with their baby compared to those who used a side-car crib.

Economic evidence statements

No economic evidence was identified which was applicable to this review question.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

Infant mortality within the first year, proportion of women breastfeeding (exclusively or partially) at 6 weeks, 12 weeks, and 6 months after birth, and emotional attachment between parent and baby when the baby is 12 to 18 months of age were considered critical outcomes. Mother's satisfaction with own sleep in the first 8 weeks after birth, serious illness in the baby, parental emotional health and wellbeing in the first 8 weeks after the birth, and parental satisfaction were considered important outcomes.

Infant mortality within the first year was rated a critical outcome because bed sharing has been associated with increased rates of sudden unexpected death in infancy (SUDI) and the committee wanted to see if bed sharing would lead to increased infant mortality. The proportion of women breastfeeding and emotional attachment between parent and baby were prioritised as critical outcomes because proponents of bed sharing refer to its ability to facilitate increased breastfeeding and the committee were interested in whether this could impact on breastfeeding outcomes.

Mother's satisfaction with own sleep and parental emotional health and wellbeing in the first 8 weeks after birth and parental satisfaction were prioritised as important outcomes, because mental health problems are an important issue in the postnatal period and the committee wanted to see if sleeping arrangements could impact on this. Serious illness in the baby was also considered an important outcome.

There was evidence on the proportion of women breastfeeding (critical outcome) and serious illness in the baby and parental satisfaction (important outcomes).

There was no evidence on infant mortality within the first year (critical outcome) for any of the comparisons. In addition, there was no RCT evidence on emotional attachment between parent and baby (critical outcome) or mother's satisfaction with own sleep in the first 8 weeks after the birth or parental emotional health and wellbeing (important outcomes) for any of the comparisons. However, evidence was available from observational studies on emotional attachment between parent and baby at 14 months, and parental emotional health and wellbeing for the comparison between shared sleep surface versus no shared sleep surface.

For the majority of outcomes where evidence was identified, there wasn't a significant amount of evidence on the pre-specified time points in the protocol, therefore there was some flexibility with the time points of these outcomes.

The quality of the evidence

RCTs

The quality of the RCT evidence was very low. The risk of bias was high in every RCT. In all trials there was insufficient information to assess whether random sequence generation and allocation concealment was adequate. None of the participants could be blinded to their intervention in any of the trials, which could have resulted in performance bias. Additionally, blinding of outcome assessors was either not possible or not done except in 1 trial (Ball 2006), potentially leading to detection bias in outcome assessment for the subjective outcomes, such as maternal satisfaction. Some studies reported substantial non-compliance and differential cross-over between intervention and control groups.

One RCT (Moon 2017) was treated as providing observational data due to the study originally being designed to compare the effectiveness of counselling to reduce bed sharing on breastfeeding rates so participants were not randomised directly into bed sharing versus no bed sharing.

All of the studies were downgraded for indirectness due to it being unknown whether co-sleeping with the baby on a shared sleep surface took place within the first 8 weeks after birth.

Some breastfeeding outcomes were downgraded due to imprecision as the 95% confidence intervals crossed the null effects and/or there were fewer than 300 events in the study. Other outcomes were downgraded due to imprecision from the 95% confidence intervals crossing 1 or both of the values of minimally important differences (MIDs), which in turn is related to sample size.

Observational studies

The quality of evidence from observational studies was very low. The risk of bias was very high in all studies due to the potential for confounding, missing data, and use of self-report measures.

Five of the studies (Ball 2012; Brenner 2003; Broussard 2012; Luijk 2013; McCoy 2004) were downgraded for indirectness due to the data reported in the papers deviating from the protocol, that is the exposures and outcomes stated in the protocol were presented the opposite way around in the papers.

Some evidence for breastfeeding outcomes were downgraded due to imprecision as the 95% confidence intervals crossed the null effects and/or there were fewer than 300 events in the study. Other outcomes were downgraded due to imprecision from the 95% confidence intervals crossing 1 or both of the values of minimally important differences (MIDs) for dichotomous outcomes.

There was some uncertainty around the confidence in the outcomes of 1 study (Mileva-Seitz 2016), as there was no dose-response gradient between the amount of co-sleeping and emotional attachment between the parent and baby.

One study (Blair 2010) used longitudinal latent class analysis as opposed to the cluster analysis approach adopted in other observational studies. A limitation of the longitudinal latent class analysis is fewer subjects providing data for the larger number of observational time points (latent classes). Nonetheless, the large population of the study ensured that there was enough data to differentiate between the different groupings.

Benefits and harms

The committee agreed that on the basis of the evidence presented, which showed no greater risk of harm when parents shared a bed with their baby compared to not bed sharing, healthcare professionals should not routinely advise parents against sharing a bed with their baby. They agreed about the importance of parental choice in relation to bed sharing with their baby assuming they follow safe practices for bed sharing. The committee used the data from evidence review N on co-sleeping risk factors in relation to SUDI and their own expert knowledge, to recommend advice on safer practices for bed sharing that practitioners should provide to parents and circumstances when bed sharing might not be safe and should be strongly advised against.

A significant body of evidence indicated a higher association between mothers who share a bed with their baby and those who continue to breastfeed (any, exclusively, and partially) at various time points. However, although the studies showed close ties between breastfeeding and bed sharing the committee recognised that due to the interlinking relationship between the two in practice and the cross-sectional design of studies, it is difficult to infer causality. Furthermore, the majority of cross-sectional studies (Ball 2012, Broussard 2012, Luijk 2013, McCoy 2004) looked at breastfeeding as the exposure and bed sharing as the outcome, inverse to the protocol, assessing the exposure and outcome concurrently adds further uncertainty to causality. One study (Blair 2010) attempted to address this problem by assessing the data longitudinally. The analysis demonstrated that mothers who bed shared for the first year, after the first year, and throughout the first 4 years of the child's life all had higher rates of breastfeeding at 12 months. Although causality cannot be established from the evidence, the committee agreed, on the basis of their own expert knowledge that if healthcare professionals advise parents not to share a bed with their baby, this would most likely lead to less successful or shorter breastfeeding.

One study (Mileva-Seitz 2016) demonstrated an association between higher rate of insecure and disorganised infants at 14 months and no bed sharing. Similar to the association between breastfeeding and bed sharing, the committee agreed that causality couldn't be inferred for this association.

The committee discussed the association between higher depression scores and partner-associated stress with mother's who share a bed with their baby. Again, the studies (Brenner 2003, Luijk 2013) looked at depression scores and partner-associated stress as the exposure and bed sharing as the outcome, inverse to the protocol. The committee further highlighted that it's difficult to ascertain whether higher depression scores or partner-associated stress cause bed sharing or vice versa, thus no recommendations were made based on this association.

Cost effectiveness and resource use

No economic evidence is available for this review question. The committee agreed that identifying benefits and risks of bed sharing and offering relevant advice to parents is likely to improve outcomes for the babies and parents at a very small cost, associated with the health professionals' time spent on offering advice. Given that some time is already spent offering relevant advice to parents in current practice, the resource implications of the recommendations were considered to be negligible.

Other factors the committee took into account

The committee noted during protocol development that certain subgroups of women may require special consideration due to their potential vulnerability:

- twins
- young women (19 years or under)
- women sleeping separately from a partner
- women with physical and cognitive disabilities
- women with severe mental health illness
- nature of the sleep surface, for example shared bed or sofa/armchair
- smoking, alcohol, drugs (prescribed or recreational)
- sleeping with other siblings
- intentional and unintentional co-sleeping
- co-sleeping all night, every night and co-sleeping some of the time.

A stratified analysis was therefore predefined in the protocol based on these subgroups. However, considering the lack of evidence for these sub-groups, the committee agreed not to make separate recommendations and that the recommendations they did make should apply universally.

References

Ball 2006

Ball, H. L., Ward-Platt, M. P., Heslop, E., Leech, S. J., Brown, K. A., Randomised trial of infant sleep location on the postnatal ward, *Archives of Disease in Childhood*, 91, 1005-1010, 2006

Ball 2011

Ball, H. L., Ward-Platt, M. P., Howel, D., Russell, C., Randomised trial of sidecar crib use on breastfeeding duration (NECOT), *Archives of Disease in Childhood*, 96, 630-634, 2011

Ball 2012

Ball, H. L., Moya, E., Fairley, L., Westman, J., Oddie, S., Wright, J., Bed- and sofa-sharing practices in a UK biethnic population, *Pediatrics*, 129, e673-e681, 2012

Ball 2016

Ball, H. L., Howel, D., Bryant, A., Best, E., Russell, C., Ward-Platt, M., Bed-sharing by breastfeeding mothers: Who bed-shares and what is the relationship with breastfeeding duration?, *Acta Paediatrica, International Journal of Paediatrics*, 105, 628-634, 2016

Blair 2010

Blair, P. S., Heron, J., Fleming, P. J., Relationship between bed sharing and breastfeeding: Longitudinal, population-based analysis, *Pediatrics*, 126, e1119-e1126, 2010

Brenner 2003

Brenner, R. A., Simons-Morton, B. G., Bhaskar, B., Revenis, M., Das, A., Clemens, J. D., Infant-parent bed sharing in an inner-city population, *Archives of Pediatrics and Adolescent Medicine*, 157, 33-39, 2003

Broussard 2012

Broussard, D. L., Sappenfield, W. M., Goodman, D. A., The Black and White of infant back sleeping and infant bed sharing in Florida, 2004-2005, *Maternal & Child Health Journal*, 16, 713-24, 2012

Luijk 2013

Luijk, M. P. C. M., Mileva-Seitz, V. R., Jansen, P. W., van, IJzendoorn M. H., Jaddoe, V. W. V., Raat, H., Hofman, A., Verhulst, F. C., Tiemeier, H., Ethnic differences in prevalence and determinants of mother-child bed-sharing in early childhood, *Sleep Medicine*, 14, 1092-1099, 2013

McCoy 2004

McCoy, R. C., Hunt, C. E., Lesko, S. M., Vezina, R., Corwin, M. J., Willinger, M., Hoffman, H. J., Mitchell, A. A., Frequency of bed sharing and its relationship to breastfeeding, *Journal of Developmental and Behavioral Pediatrics*, 25, 141-149, 2004

Mileva-Seitz 2016

Mileva-Seitz, V. R., Luijk, M. P. C. M., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Jaddoe, V. W. V., Hofman, A., Verhulst, F. C., Tiemeier, H., Association between infant nighttime-sleep location and attachment security: No easy verdict, *Infant Mental Health Journal*, 37, 5-16, 2016

Moon 2017

Moon, R. Y., Mathews, A., Joyner, B. L., Oden, R. P., He, J., McCarter, R., Impact of a Randomized Controlled Trial to Reduce Bedsharing on Breastfeeding Rates and Duration for African-American Infants, *Journal of community health*, 42, 707-715, 2017

Smith 2016

Smith, L. A., Geller, N. L., Kellams, A. L., Colson, E. R., Rybin, D. V., Heeren, T., Corwin, M. J., Infant Sleep Location and Breastfeeding Practices in the United States, 2011-2014, *Academic Pediatrics*, 16, 540-549, 2016

Appendices

Appendix A – Review protocol

Review protocol for review question: What are the benefits and harms of co-sleeping?

Table 3: Review Protocol

Field (based on PRISMA-P)	Content
Review question	What are the benefits and harms of co-sleeping?
Type of review question	Intervention
Objective of the review	This review aims to determine what are the benefits and harms of co-sleeping. By co-sleeping, we mean mother and baby sharing a sleep surface, whether intentional or unintentional.
Eligibility criteria – population/disease/condition/issue/domain	Parents or carers who have a healthy baby Exclude studies with a specific population of babies who were born pre-term. This means babies born before 37 weeks since ‘term’ is considered to be between 37 and 42 weeks of pregnancy. For studies with a mixed population, they will be included if at least 66% of babies are born at term.
Eligibility criteria – intervention(s)	Co-sleeping with the baby on a shared sleep surface within the first 8 weeks after birth, whether intentional or unintentional. Shared sleep surfaces include but are not limited to the parents’ bed, the use of a side-car cot or crib, a pepi-pod, a sofa or armchair.
Eligibility criteria – comparator(s)	Baby sleeps in a cot or Moses style basket in the same room or separate room One of the other interventions

Outcomes and prioritisation	<p>Critical outcomes:</p> <ul style="list-style-type: none"> • infant mortality within the first year (MIDs: any statistically significant difference) • proportion of women breastfeeding (exclusively or partially) at 6 weeks, 12 weeks and 6 months after the birth ((MIDs: any statistically significant difference)) • emotional attachment between parent and baby when the baby is 12 to 18 months of age (MIDs: default). <p>Important outcomes:</p> <ul style="list-style-type: none"> • mother's satisfaction with own sleep in the first 8 weeks after the birth (MIDs: default) • serious illness in the baby, for example infection within the first 3 months (MIDs: default) • parental emotional health and wellbeing in the first 8 weeks after the birth (MIDs: default) • parental satisfaction (MIDs: default).
Eligibility criteria – study design	<ul style="list-style-type: none"> • Published full text papers only • RCTs • Systematic reviews of RCTs • Only if RCTs unavailable to inform decision making: prospective or retrospective comparative cohort studies or case control studies of at least 50 mother-infant pairs in each arm • Cohort studies will be prioritised over case-control studies • Prospective study designs will be prioritised over retrospective study designs • Conference abstracts will not be considered <p>Studies of co-sleeping within the first 8 weeks will be prioritised and if none are available then analyses of co-sleeping beyond 8 weeks (e.g. 3 months) will be included.</p> <p>Addendum: Following agreement with the guideline committee after the protocol had been signed off, a post hoc restriction was applied to include only studies that reported adjusted data for the outcomes of interest. Adjusting data attempts to take into account and adjust estimates of effect for methodological limitations (i.e. likely biases) associated with the studies.</p>
Other inclusion exclusion criteria	<p>Studies from low- and middle-income countries, as defined by the World Bank, will be excluded, as the configuration of antenatal and postnatal services in these countries might not be representative of that in the UK.</p> <p>Date: Studies conducted post 1990 will be considered for this review question, as there was a big change in 1991 with the 'back to sleep campaign', after which fashions in co-sleeping changed markedly.</p>

<p>Proposed sensitivity/sub-group analysis, or meta-regression</p>	<p>Groups that will be reviewed and analysed separately:</p> <ul style="list-style-type: none"> • singletons versus twins • young women (19 years or under) • women sleeping separately from a partner • women with physical and cognitive disabilities • women with severe mental health illness • nature of the sleep surface, for example shared bed or sofa/armchair • smoking, alcohol, drugs (prescribed or recreational) • sleeping with other siblings • intentional and unintentional co-sleeping • co-sleeping all night, every night and co-sleeping some of the time. <p>In the presence of heterogeneity, the following subgroups will be considered for sensitivity analysis:</p> <ul style="list-style-type: none"> • low-income population versus the general population • cultural practicing population versus the general population. <p>Potential confounders:</p> <ul style="list-style-type: none"> • Characteristics defining the groups above
<p>Selection process – duplicate screening/selection/analysis</p>	<p>Sifting, data extraction and appraisal of methodological quality will be performed by the systematic reviewer. Any disputes will be resolved in discussion with the senior systematic reviewer and the Topic Advisor. Quality control will be performed by the senior systematic reviewer.</p> <p>Review questions selected as high priorities for health economic analysis (and those selected as medium priorities and where health economic analysis could influence recommendations) will be subject to dual weeding and study selection; any discrepancies above 10% of the dual weeded resources will be resolved through discussion between the first and second reviewers or by reference to a third person.</p> <p>This review question was not prioritised for health economic analysis and so no formal dual weeding, study selection (inclusion/exclusion) or data extraction into evidence tables will be undertaken. (However, internal (NGA) quality assurance processes will include consideration of the outcomes of weeding, study selection and data extraction and the committee will review the results of study selection and data extraction).</p>

Data management (software)	<p>Pairwise meta-analyses will be performed using Cochrane Review Manager (RevMan5).</p> <p>'GRADEpro' was used to assess the quality of evidence for each outcome.</p>
Information sources – databases and dates	<p>The following databases will be searched:</p> <ul style="list-style-type: none"> • CCRCT • CDSR • DARE • Embase • EMCare • HTA Database • MEDLINE and MEDLINE IN-PROCESS <p>Searches will be restricted by:</p> <ul style="list-style-type: none"> • Date limitations: 1990 to 10th May 2019 • English language • Human studies <p>Other searches:</p> <ul style="list-style-type: none"> • Inclusion lists of systematic reviews
Identify if an update	Not an update, but linked to the review question from the 2014 addendum 'What is the risk of co-sleeping in relation to sudden infant death syndrome (SIDS)?'
Author contacts	National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10070
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014

Search strategy – for one database	For details please see appendix B
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables).
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables).
Methods for assessing bias at outcome/study level	<p>Standard study checklists will be used to critically appraise individual studies. For details please see section 6.2 of Developing NICE guidelines: the manual</p> <p>The risk of bias across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/</p>
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual 2014
Methods for analysis – combining studies and exploring (in)consistency	For a full description of the methods see Supplement 1.
Meta-bias assessment – publication bias,	For details please see section 6.2 of Developing NICE guidelines: the manual 2014

selective reporting bias	
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014
Rationale/context – Current management	For details please see the introduction to the evidence review
Describe contributions of authors and guarantor	<p>A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance and chaired by Dr David Jewell in line with section 3 of Developing NICE guidelines: the manual 2014.</p> <p>Staff from the National Guidelines Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For a full description of the methods see Supplement 1.</p>
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England
PROSPERO registration number	This protocol has not been registered in PROSPERO

BMI: body mass index; CDSR: Cochrane Database of Systematic Reviews; CINAHL: Cumulative Index of Nursing and Allied Health Literature; CCRT:: Cochrane Central Register of Controlled Trials; DARE: Database of Abstracts of Reviews of Effects; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology Assessment; MID: minimally important difference; NGA: National Guideline Alliance; NHS EED: National Health Service Economic Evaluation Database; NICE: National Institute for Health and Care Excellence; PROSPERO: Prospective Register of Systematic Review Protocols on health related topics; RCT: randomised controlled trial

Appendix B – Literature search strategies

Literature search strategies for review question: What are the benefits and harms of co-sleeping?

Clinical search

The search for this topic was last run on 10th May 2019.

Database: Emcare, Embase, Medline, Medline Ahead of Print and In-Process & Other Non-Indexed Citations – OVID [Multifile]

#	Search
1	exp infant/ use emczd, emcr, ppez
2	(babies or baby or infant* or newborn* or new born*).ti,ab.
3	1 or 2
4	exp parent/ use emczd, emcr or exp parents/ use ppez
5	(carer* or caregiv* or care giv* or father* or mother* or parent*).ti,ab.
6	or/4-5
7	exp sleep/ use emczd, emcr or exp sleep/ use ppez
8	((shar* or sleep*) adj3 (armchair* or arm chair* or basket* or bed or beds or chair* or cot*1 or crib* or period* or peri pod* or sidecar* or side car* or sofa* or (sleep adj2 surface*))) or bedshar* or cosleep* or co sleep* or (sleep* adj2 with adj (babies or baby or infant* or newborn* or new born*)).ti,ab.
9	or/7-8
10	(3 and 6 and 9) or (3 and 8)
11	limit 10 to english language
12	limit 11 to yr="1990-current"
13	((animal/ not human/) or nonhuman/ or exp animal experiment/ or exp experimental animal/ or animal model/ or exp rodent/) use emczd, emcr or ((animals/ not humans/) or exp animals, laboratory/ or exp animal experimentation/ or exp models, animal/ or exp rodentia/) use ppez or (rat or rats or mouse or mice).ti.
14	12 not 13

Database: CDSR, CCRCT [Wiley]

#	Search
1	mesh descriptor: [infant] explode all trees
2	((babies or baby or infant* or newborn* or "new born*")):ti,ab,kw
3	#1 or #2
4	mesh descriptor: [parents] explode all trees
5	((carer* or caregiv* or "care giv*" or father* or mother* or parent*)):ti,ab,kw
6	#4 or #5
7	mesh descriptor: [sleep] explode all trees
8	(((((shar* or sleep*) near/3 (armchair* or "arm chair*" or basket* or bed or beds or chair* or cot* or crib* or period* or "peri pod*" or sidecar* or "side car*" or sofa* or (sleep near/2 surface*))) or bedshar* or cosleep* or "co sleep*" or (sleep* near/2 with* near/1 (babies or baby or infant* or newborn* or "new born*")))):ti,ab,kw
9	#7 or #8
10	(#3 and #6 and #9) or (#3 and #8) with cochrane library publication date from jan 1990 to may 2019

Database: DARE, HTA (global) [CRD Web]

#	search
1	mesh descriptor infant explode all trees in dare, hta

2	(babies or baby or infant* or newborn* or "new born*") in dare, hta
3	#1 or #2
4	mesh descriptor parents explode all trees in dare, hta
5	(carer* or caregiv* or "care giv*" or father* or mother* or parent*)
6	#4 or #5
7	mesh descriptor sleep explode all trees in dare, hta
8	(((shar* or sleep*) near3 (armchair* or "arm chair*" or basket* or bed or beds or chair* or cot* or crib* or period* or "peri pod*" or sidecar* or "side car*" or sofa* or (sleep near2 surface*))) or bedshar* or cosleep* or "co sleep*" or (sleep* near2 with* near1 (babies or baby or infant* or newborn* or "new born*"))))
9	#7 or #8
10	(#3 and #6 and #9) or (#3 and #8) from 1990 to 2019

Health economic search

The search for this topic was last run on 5th December 2019.

Database: Emcare, Embase, Medline, Medline Ahead of Print and In-Process & Other Non-Indexed Citations (global) – OVID [Multifile]

#	Search
1	puerperium/ or perinatal period/ or postnatal care/
2	1 use emczd, emcr
3	postpartum period/ or peripartum period/ or postnatal care/
4	3 use ppez
5	(nullipara* or peri natal* or perinatal* or postbirth or post birth or postdelivery or post delivery or postnatal* or post natal* or postpartum* or post partum* or primipara* or puerpera* or puerperium* or ((after or follow*) adj2 birth*)).ti,ab.
6	or/2,4-5
7	breast feeding/ or breast feeding education/ or lactation/
8	7 use emczd, emcr
9	exp breast feeding/ or lactation/
10	9 use ppez
11	(breastfeed* or breast feed* or breastfed* or breastfeed* or breast fed or breastmilk or breast milk or expressed milk* or lactat* or (nursing adj (baby or infant* or mother* or neonate* or newborn*))).ti,ab.
12	or/8,10-11
13	artificial food/ or bottle feeding/ or infant feeding/
14	13 use emczd, emcr
15	bottle feeding/ or infant formula/
16	15 use ppez
17	(((bottle or formula or synthetic) adj2 (artificial or fed or feed* or infant* or milk*)) or (artificial adj (formula or milk)) or bottlefed or bottlefeed or cup feeding or (milk adj2 (substitut* or supplement*)) or ((infant or milk or water or glucose or dextrose or formula) adj supplement) or formula supplement* or supplement feed or milk feed or ((baby or babies or infant* or neonate* or newborn*) adj (formula* or milk)) or formulafeed or formulated or (milk adj2 powder*) or hydrolyzed formula* or (((feeding or baby or infant) adj bottle*) or infant feeding or bottle nipple* or milk pump*)).ti,ab.
18	or/14,16-17
19	or/6,12,18

#	Search
20	budget/ or exp economic evaluation/ or exp fee/ or funding/ or exp health care cost/ or health economics/
21	20 use emczd, emcr
22	exp budgets/ or exp "costs and cost analysis"/ or economics/ or exp economics, hospital/ or exp economics, medical/ or economics, nursing/ or economics, pharmaceutical/ or exp "fees and charges"/ or value of life/
23	22 use ppez
24	budget*.ti,ab. or cost*.ti. or (economic* or pharmaco?economic*).ti. or (price* or pricing*).ti,ab. or (cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab. or (financ* or fee or fees).ti,ab. or (value adj2 (money or monetary)).ti,ab.
25	or/21,23-24
26	economic model/ or quality adjusted life year/ or "quality of life index"/
27	(cost-benefit analysis.sh. and (cost-effectiveness ratio* and (perspective* or life expectanc*).tw.)
28	((quality of life or qol).tw. and cost benefit analysis.sh.)
29	or/26-28 use emczd, emcr
30	models, economic/ or quality-adjusted life years/
31	(cost-benefit analysis.sh. and (cost-effectiveness ratio* and (perspective* or life expectanc*).tw.)
32	((quality of life or qol).tw. and cost-benefit analysis.sh.)
33	or/30-32 use ppez
34	(eq-5d* or eq5d* or eq-5* or eq5* or euroqual* or euro qual* or euroqual 5d* or euro qual 5d* or euro qol* or euroqol* or euro quol* or euroquol* or euro quol5d* or euroquol5d* or eur qol* or eurqol* or eur qol5d* or eurqol5d* or eur?qul* or eur?qul5d* or euro* quality of life or european qol).tw.
35	(euro* adj3 (5 d* or 5d* or 5 dimension* or 5dimension* or 5 domain* or 5domain*).tw.
36	(hui or hui2 or hui3).tw.
37	(illness state* or health state*).tw.
38	(multiattribute* or multi attribute*).tw.
39	(qaly* or qal or qald* or qale* or qtime* or qwb* or daly).tw.
40	(quality adjusted or quality adjusted life year*).tw.
41	(sf36 or sf 36 or sf thirty six or sf thirtysix).tw.
42	sickness impact profile.sh.
43	(time trade off*1 or time tradeoff*1 or tto or timetradeoff*1).tw.
44	(utilit* adj3 (score*1 or valu* or health* or cost* or measur* or disease* or mean or gain or gains or index*).tw.
45	utilities.tw.
46	((qol or hrqol or quality of life).tw. or *quality of life/) and ((qol or hrqol* or quality of life) adj2 (change*1 or declin* or decreas* or deteriorat* or effect or effects or high* or impact*1 or impacted or improve* or increas* or low* or reduc* or score or scores or worse)).ab.
47	quality of life.sh. and ((health-related quality of life or (health adj3 status) or ((quality of life or qol) adj3 (chang* or improv*))) or ((quality of life or qol) adj (measure*1 or score*1))).tw. or (quality of life or qol).ti. or ec.fs.)
48	or/29,33-47

#	Search
49	or/25,48
50	19 and 50
51	limit 50 to english language
52	(animals/ not humans/) or exp animals, laboratory/ or exp animal experimentation/ or exp models, animal/ or exp rodentia/
53	52 use ppez
54	(animal/ not human/) or nonhuman/ or exp animal experiment/ or exp experimental animal/ or animal model/ or exp rodent/
55	54 use emczd, emcr
56	(rat or rats or mouse or mice).ti.
57	or/53,55-56
58	51 not 57

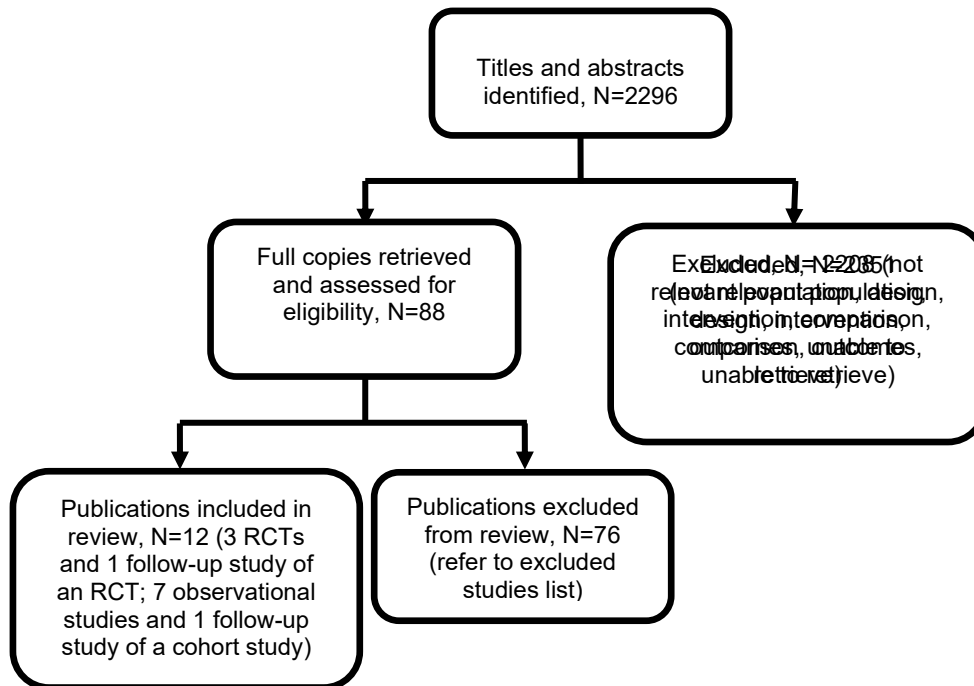
Database: HTA, NHS EED (global) [CRD Web]

#	Search
1	mesh descriptor postpartum period in hta, nhs eed
2	mesh descriptor peripartum period in hta, nhs eed
3	mesh descriptor postnatal care in hta, nhs eed
4	(nullipara* or peri natal* or perinatal* or postbirth or post birth or postdelivery or post delivery or postnatal* or post natal* or postpartum* or post partum* or primipara* or puerpera* or puerperium* or ((after or follow* near2 birth*)) in hta, nhs eed
5	#1 or #2 or #3 or #4
6	mesh descriptor breast feeding explode all trees in hta, nhs eed
7	mesh descriptor lactation in hta, nhs eed
8	(breastfeed* or breast feed* or breastfed* or breastfeed* or breast fed or breastmilk or breast milk or expressed milk* or lactat* or (nursing next (baby or infant* or mother* or neonate* or newborn*))) in hta, nhs eed
9	#6 or #7 or #8
10	mesh descriptor bottle feeding in hta, nhs eed
11	mesh descriptor infant formula in hta, nhs eed
12	((((bottle or formula or synthetic) near2 (artificial or fed or feed* or infant* or milk*)) or (artificial next (formula or milk)) or bottlefed or bottlefeed or cup feeding or (milk near2 (substitut* or supplement*)) or ((infant or milk or water or glucose or dextrose or formula) next supplement) or formula supplement* or supplement feed or milk feed or ((baby or babies or infant* or neonate* or newborn*) next (formula* or milk)) or formula feed or formulated or (milk near2 powder*) or hydrolyzed formula* or (((feeding or baby or infant) next bottle*) or infant feeding or bottle nipple* or milk pump*)) in hta, nhs eed
13	#10 or #11 or #12
14	#5 or #9 or #13

Appendix C – Clinical evidence study selection

Clinical study selection for: What are the benefits and harms of co-sleeping?

Figure 1: Study selection flow chart



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: What are the benefits and harms of co-sleeping?

Table 4: Evidence tables

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Full citation Ball, H. L., Howel, D., Bryant, A., Best, E., Russell, C., Ward-Platt, M., Bed-sharing by breastfeeding mothers: Who bed-shares and what is the relationship with breastfeeding duration?, Acta Paediatrica, International Journal of Paediatrics, 105, 628-634, 2016</p> <p>Ref Id 810802</p> <p>Country/ies where the study was carried out</p>	<p>Sample size See Ball 2011 for study details</p> <p>Bed sharing category Rare/never n=299; Intermittent n=192; Often n=187; Poor response n=192.</p> <p>At home during first 13 postnatal weeks</p> <p>Characteristics See Ball 2011 for study details</p> <p>Inclusion criteria See Ball 2011 for study details</p> <p>Exclusion criteria</p>	<p>Interventions See Ball 2011 for study details</p>	<p>Details As no differences in behaviour were detected between the two trial arms in the NECOT trial (Ball 2011), the authors combined the follow-up data from all trial participants to examine breastfeeding and at-home bed-sharing in this sample. For each participant, bed-sharing behaviour was categorised in 4-week blocks, beginning from the infant's birth week; data from weeks 25 and 26 were omitted so that intervals were uniform in length. Each 4-week period was characterised by the majority behaviour, as</p>	<p>Results</p> <p>Exclusive breastfeeding at 6 weeks Bedsharing= 114/187 Not bed sharing= 105/299</p> <p>Exclusive breastfeeding at 12 weeks Bedsharing= 88/187 Not bed sharing= 69/299</p> <p>Exclusive breastfeeding at 25 weeks Bedsharing= 17/187 Not bed sharing= 15/299</p> <p>Any breastfeeding at 6 weeks Bedsharing= 174/187</p>	<p>Limitations</p> <p>The quality assessment of the original NECOT trial (Ball 2011) was performed using the Cochrane risk of bias tool for RCTs; additional assessments were performed for the follow up study</p> <p>Random sequence generation- Unclear risk ("When women reached 34 weeks of gestation the first author allocated them to the control or intervention condition, stratified by parity, via the Newcastle Clinical Trials Unit's online randomisation service.")</p> <p>Allocation concealment- High risk ("Women received the pre-</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Study type Follow up study of NECOT trial (Ball 2011)</p> <p>Aim of the study See Ball 2011 for study details</p> <p>Study dates See Ball 2011 for study details</p> <p>Source of funding See Ball 2011 for study details</p>	See Ball 2011 for study details		<p>long as data for no more than 1 week was missing.</p> <p>Frequent bed sharing: If a mother and baby shared a bed for at least an hour in 3 or 4 of the 4 weeks in a block</p> <p>No bed share: mother did not report sleeping with her baby for at least an hour in at least 1 of the 4 weeks in the block</p>	<p>Not bed sharing= 194/299</p> <p>Any breastfeeding at 12 weeks Bedsharing= 161/187 Not bed sharing= 152/299</p> <p>Any breastfeeding at 25 weeks Bedsharing= 131/187 Not bed sharing= 105/299</p>	<p>allocated cot type from midwives on the postnatal ward and kept them for the hospital stay.")</p> <p>Blinding of participants and personnel- High risk (Blinding not possible)</p> <p>Blinding of outcome assessment- High risk (Blinding not possible)</p> <p>Incomplete outcome data- High risk ("The problem of missing data limited the detail of the analysis"- there were insufficient data for 192/870 (22%) of mothers)</p> <p>Selective reporting- High risk ("An 'as treated' analysis showed little difference in duration of any or exclusive breastfeeding between those who actually received a sidecar crib or a standalone cot, but was performed post hoc")</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Other sources of bias- High risk ("Of the 532 women randomised to the sidecar crib, 347 definitely received it, 129 did not and for 56 it was not known. Of the 539 women randomised to the standalone cot, 428 definitely received it, three did not and for 108 it was not known.")
<p>Full citation Ball,H.L., Moya,E., Fairley,L., Westman,J., Oddie,S., Wright,J., Bed- and sofa-sharing practices in a UK biethnic population, Pediatrics, 129, e673-e681, 2012</p> <p>Ref Id 235277</p> <p>Country/ies where the study was carried out UK</p>	<p>Sample size N=668 (Regular bed-share n= 143; Ever bed-share n=310; Ever sofa-share n=188; Ever bed-share and ever sofa-share n=27)</p> <p>Characteristics Baseline characteristics for whole study population Age, years, number (%): <20: 109 (5.5) 20 to 24: 527 (26.4) 25 to 29: 685 (34.3) 30 to 34: 427 (21.4) ≥35: 252 (12.6)</p>	<p>Interventions Regular bed-share: regularly or every night.</p>	<p>Details Recruitment: The authors of the Born in Bradford (BiB) and Bradford Infant Care Study (BradICS) recruited women at 26 to 28 weeks' gestation.</p> <p>Data collection: Women completed a baseline questionnaire at recruitment. Women who gave birth at the Bradford Royal Infirmary were then contacted by telephone when their infants were aged 2 to 4 months. Data were also</p>	<p>Results *Breastfeeding - Never and <1 week Adjusted OR 1.00 (reference) 1 to <8 weeks Regular bed-share: Adjusted OR 1.15 (95% CI 0.65 to 2.02) ≥8 weeks Regular bed-share: Adjusted OR 3.06 (95% CI 2.00 to 4.66)</p>	<p>Limitations Quality of study assessed using ROBINS-I</p> <p>Confounding bias: High risk (appropriate methods used to control for baseline confounding, but variables measured through self-report).</p> <p>Selection of participants' bias: High risk (participants analysed based on response to co-sleeping questions).</p> <p>Classification of interventions bias: Low-</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Study type Cohort study</p> <p>Aim of the study To assess parent-infant co-sleeping (bed- and sofa-sharing) in a multi-ethnic urban population in the UK.</p> <p>Study dates June 2008 to September 2009.</p> <p>Source of funding Foundation for the Study of Infant Deaths (FSID).</p>	<p>Education completed, number (%): None: 291 (14.5) Secondary school: 642 (32.1) Further and higher: 804 (40.2) Other: 230 (11.5) Not known: 33 (1.75)</p> <p>Index of Multiple Deprivation quintile, number (%) 1 (least deprived): 38 (1.9) 2: 80 (4.0) 3: 242 (12.1) 4: 370 (18.5) 5 (most deprived): 1270 (63.5)</p> <p>Birth weight, g, mean (SD): 3.24 (0.55)</p> <p>Gestational age, completed weeks, mean (SD): 39.2 (1.7)</p> <p>Parity, number (%): 0: 775 (38.8)</p>		<p>collected from the hospital birth records.</p> <p>Outcomes: The outcome of interest to this review question was the association between breastfeeding duration (never and <1 weeks versus 1 to <8 weeks; ≥8 weeks) and regular bed-share.</p> <p>Follow up: Not reported.</p> <p>Data analysis: Univariate logistic regression was used to assess the association between each potential risk factor and bed-sharing practices (i.e., ever bed-share, regular bed-sharing, and ever sofa-share). If data were missing on any potential risk factors, they were excluded from the analysis.</p>		<p>risk (bed-sharing was clearly defined).</p> <p>Deviations from intended interventions bias: NI (participants were not assigned to co-sleeping, these were the co-sleeping practices reported by the participants).</p> <p>Missing data bias: Moderate risk (unclear whether missing data similar across different co-sleeping groups; missing data not included in the analysis).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective).</p> <p>Selection of the reported results bias: Low risk (methods on data analyses pre-specified; adjusted and unadjusted ORs reported). Other information</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	<p>1: 592 (29.6) 2: 338 (16.9) ≥3: 295 (14.7) Breastfeeding, weeks, number (%): Never and <1: 872 (43.6) 1 to <8: 442 (22.1) ≥8: 686 (34.3)</p> <p>Infant sleeps in own room, number (%): No: 1767 (88.4) Yes: 233 (11.6)</p> <p>Infant age at completion of survey, weeks, mean (SD): 16.2 (2.88)</p> <p>Inclusion criteria White British and Pakistani women who gave birth at the Bradford Royal Infirmary; singleton birth.</p> <p>Exclusion criteria Not stated.</p>		<p>Multivariate models used a backward stepwise procedure including variables with a significance level of $p < 0.05$. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) reported.</p>		<p>The study also included other co-sleeping practices (ever bed-share; $n=310$, and ever sofa-share; $n=188$), but data on for these practices are not reported in this review. No relevant data were reported for "ever bed-share and ever sofa-share" ($n=27$).</p> <p>*Co-sleeping was assessed as the outcome; comparisons were between breastfeeding 1 to <8 weeks and ≥8 weeks versus no/<1 week breastfeeding.</p> <p>Data on breastfeeding does not meet protocol criteria (i.e. breastfeeding at 6 and 12 weeks and 6 months after the birth).</p>
Full citation	Sample size Total $n=61$	Interventions	Details	Results	Limitations

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Ball, H. L., Ward-Platt, M. P., Heslop, E., Leech, S. J., Brown, K. A., Randomised trial of infant sleep location on the postnatal ward, Archives of Disease in Childhood, 91, 1005-1010, 2006</p> <p>Ref Id 880493</p> <p>Country/ies where the study was carried out UK</p> <p>Study type Single-centre RCT</p> <p>Aim of the study To determine whether postnatal mother–infant sleep proximity affects breastfeeding initiation and infant safety.</p>	<p>Sleeping in mother's bed n=18 Sleeping in a side-car crib n=23 Sleeping in a stand-alone cot n=20</p> <p>Characteristics Mother's bed, n= 18 Age, years, mean (range) years= 32.8 (28-39)</p> <p>Gestation, days, mean (range)= 283.9 (268-298) Birth weight, kg, mean (range)= 3.3 (2.8-4.0)</p> <p>Ethnicity, n (%) White European= 16 (89) Asian= 2 (11)</p> <p>Labour, n (%) Spontaneous= 16 (89) Induced= 2 (11)</p> <p>5-minute APGAR, median (range)= 9 (8-10) Side-car crib, n= 23 Age, years, mean (range) years= 31.4 (21-40)</p>	<p>Mother's bed: the baby sleeping in the mother's bed, usually with the provision of removable cot-sides to prevent falls</p> <p>Side-car crib: baby sleeping in a side-car that is attached to the frame of the mother's bed and is enclosed on three sides, allowing the baby a separate sleep surface, but that is contiguous with the mother's bed</p> <p>Stand-alone cot</p>	<p>Recruitment: The study authors recruited pregnant women attending antenatal breastfeeding workshops (held once or twice a month) in Newcastle upon Tyne, UK.</p> <p>Data collection: "A small camcorder with infrared filming capability was erected atop a 2-m monopod attached to the foot of the mother's bed, with the recorder housed in an attache case placed under the bed. Mothers were provided with a remote control and requested to start the recording whenever they intended to settle down for sleep. The tape recorded for 8 h or until the mother chose to terminate filming.</p> <p>Mothers were requested to keep their baby in the allocated</p>	<p>Adverse events (not defined) during course of study Bed= 0/18 Side-car crib= 0/23 Stand-alone cot= 0/20</p> <p>Maternal satisfaction, scale not reported, n, mean score (SD) Bed= 18, 3.1 (1.1) Side-car crib= 23, 3.2 (0.9) Stand-alone cot= 20, 2.8 (0.8)</p>	<p>The quality assessment was performed using the Cochrane risk of bias tool for RCTs</p> <p>Random sequence generation- Low risk ("Recruits were randomly allocated, by a concealed sequence compiled with a random number generator") Allocation concealment- Unclear risk (not reported)</p> <p>Blinding of participants and personnel- High risk ("We described the study as an infant sleep study to investigate the effects of the three conditions on the postnatal experience generally. True blinding was not possible either for investigators or for participants.")</p> <p>Blinding of outcome assessment- High risk Study described as an infant sleep study to</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Study dates Not reported</p> <p>Source of funding Babes-in-Arms</p>	<p>Gestation, days, mean (range)= 283.2 (270-293)</p> <p>Birth weight, kg, mean (range)= 3.4 (2.6-4.3)</p> <p>Ethnicity, n (%)</p> <p>White European=22 (96)</p> <p>Asian=1 (4)</p> <p>Labour, n (%)</p> <p>Spontaneous=17 (77)</p> <p>Induced=5 (22)</p> <p>5-minute APGAR, median (range)=9 (9-10)</p> <p>Stand-alone cot, n= 20</p> <p>Age, years, mean (range) years=30.9 (22-37)</p> <p>Gestation, days, mean (range)=280.6 (263-292)</p> <p>Birth weight, kg, mean (range)=3.5 (2.9-4.3)</p> <p>Ethnicity, n (%)</p> <p>White European=29 (95)</p> <p>Asian=1 (5)</p> <p>Labour, n (%)</p> <p>Spontaneous=16 (80)</p> <p>Induced=4 (20)</p> <p>5-minute APGAR, median (range)=9 (9-10)</p> <p>Inclusion criteria</p>		<p>sleep location when they were asleep. We did not specify how or where mothers should feed their infants. Mothers and babies were filmed on the first two postnatal nights. After filming, we offered mothers the opportunity to view their videotapes as per standard guidelines, and obtained further consent for the videos to be analysed.</p> <p>Mothers then participated in a semi-structured interview regarding their postnatal experience, and we abstracted labour and delivery information from the case notes. On completion of the study, mothers received a £10 gift voucher for baby products and a tape of clips from their two nights of filming (approved by the local</p>		<p>investigate the effects of the three conditions on the postnatal experience generally. True blinding was not possible either for investigators or for participants.)</p> <p>Incomplete outcome data- Low risk (ITT analysis used)</p> <p>Selective reporting- High risk (Did not which scale was used to assess maternal satisfaction, did not define "adverse events" and did not report all outcomes for "potential risk exposure" listed in the Methods section)</p> <p>Other sources of bias- Low risk</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	<p>Healthy, non-smoking first-time mothers, pregnant with a single infant, anticipating a normal vaginal delivery and intending to breastfeed.</p> <p>Exclusion criteria Postpartum exclusion criteria included caesarean delivery, ill baby or mother, and receipt of intravenous or intramuscular opiate analgesics in the preceding 24 h.</p>		<p>National Health Services research ethics committee).</p> <p>Outcomes: Primary outcomes- initiation of breastfeeding (frequency per hour of unsuccessful and successful feeding attempts) and infant safety (potential risk exposure i.e. frequency per hour and proportional duration of potentially adverse situations categorised as breathing risk (external airways covered); overheating risk (head completely covered); falling risk (precarious positioning with no means of fall prevention); entrapment risk (wedged between bed and side-rail); and overlaying risk (trapped under mother's torso).</p>		

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			<p>Follow up: first and second postnatal night</p> <p>Data analysis: 3 researchers coded the video tapes using behavioural taxonomies and interobserver and intraobserver reliability was tested by recoding identical sections of tapes to ensure reliability scores were > 90%. All analyses used pairwise comparisons between the conditions using parametric or non-parametric tests according to whether or not the data were normally distributed. ITT analysis used.</p>		
<p>Full citation Ball, H. L., Ward-Platt, M. P., Howel, D., Russell, C., Randomised trial of sidecar crib use on breastfeeding duration (NECOT), Archives of Disease</p>	<p>Sample size Total N=870 Sleeping in a sidecar crib n=433 Sleeping in a standalone cot n= 437</p> <p>Characteristics Baseline characteristics at delivery (excludes those</p>	<p>Interventions Sidecar cribs versus standalone cots during hospital stay</p>	<p>Details Recruitment: Female researchers recruited pregnant women at 20-week scan clinics</p> <p>Data collection: "Following discharge, feeding and sleeping practices were reported</p>	<p>Results Exclusive breastfeeding at 6 weeks Sidecar crib=189/433 Standalone cot=194/437</p> <p>Exclusive breastfeeding at 12 weeks</p>	<p>Limitations The quality assessment was performed using the Cochrane risk of bias tool for RCTs</p> <p>Random sequence generation- Unclear risk ("When women reached 34 weeks of gestation the</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>in Childhood, 96, 630-634, 2011</p> <p>Ref id 805220</p> <p>Country/ies where the study was carried out UK</p> <p>Study type Single-centre non-blinded parallel RCT</p> <p>Aim of the study To determine whether the use of sidecar cribs on the postnatal ward affects breastfeeding duration.</p> <p>Study dates January 2008 to February 2010</p> <p>Source of funding</p>	<p>not eligible or withdrawn prior to delivery, but includes those who were later lost to follow-up and those withdrawn after deliver)</p> <p>Sidecar crib Age, years, mean (SD)=31.0 (5.6)</p> <p>Breastfeeding experience, % Multipara, previously breastfed=47 Multipara, never breastfed=9 Primipara=45</p> <p>Caesarean section, %=25</p> <p>Education completed, % Up to age 16=12 > 16 but not university=39 university= 48 Standalone cot</p> <p>Age, years, mean (SD)=30.7</p>		<p>weekly for 26 weeks using an automated interactive telephone system with reminder postcards sent by mail. Responses (made via telephone keypad) were captured to a database and uploaded to a secure website by the telecoms provider from where they were downloaded and processed by the data manager. Whenever women failed to provide data to the automated system they were contacted by telephone, letter or email to obtain missing data."</p> <p>Outcomes: "The primary outcome measures were time to cessation of exclusive breastfeeding (baby receiving only human milk in preceding week), and any breastfeeding (baby receiving human milk in</p>	<p>Sidecar crib=138/433 Standalone cot=128/437</p> <p>Exclusive breastfeeding at 26 weeks Sidecar crib=12/433 Standalone cot=12/437</p> <p>Any breastfeeding at 6 weeks Sidecar crib= 324/433 Standalone cot= 332/437</p> <p>Any breastfeeding at 12 weeks Sidecar crib= 290/433 Standalone cot= 280/437</p> <p>Any breastfeeding at 26 weeks Sidecar crib=204/433 Standalone cot=222/437</p> <p>Adverse events (not defined), n Sidecar crib= 0/433</p>	<p>first author allocated them to the control or intervention condition, stratified by parity, via the Newcastle Clinical Trials Unit's online randomisation service.")</p> <p>Allocation concealment- High risk ("Women received the preallocated cot type from midwives on the postnatal ward and kept them for the hospital stay.")</p> <p>Blinding of participants and personnel- High risk (Blinding not possible)</p> <p>Blinding of outcome assessment- High risk (Blinding not possible)</p> <p>Incomplete outcome data- Low risk</p> <p>Selective reporting- High risk ("An 'as treated' analysis showed little difference in duration of any or</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
NIHR, Research for Patient Benefit Programme	<p>Breastfeeding experience, %</p> <p>Multipara, previously breastfed=45</p> <p>Multipara, never breastfed=8</p> <p>Primipara=47</p> <p>Caesarean section, %=23</p> <p>Education completed, %</p> <p>Up to age 16=10</p> <p>> 16 but not university=41</p> <p>university= 49</p> <p>Inclusion criteria</p> <p>Sufficient English comprehension to understand the participant information sheet; normal singleton pregnancy; intention to deliver at the RVI; and had not decided against breastfeeding.</p> <p>Exclusion criteria</p> <p>Spontaneous abortion or preterm birth, or after delivery when gestation was less than 37 weeks,</p>		<p>addition to other foods or liquids). Duration of postnatal ward stay was examined as an explanatory variable; bed sharing in the first 13 weeks was a secondary outcome measure."</p> <p>Follow up: 26 weeks</p> <p>Data analysis: "The principal analyses were conducted as 'intention to treat'. There was a limited comparison of 'as treated' groups for the primary outcome as part of a sensitivity analysis of dropout (defined as failure to provide data for 4 consecutive weeks). Cox regression was used to compare time to cessation of any and exclusive breastfeeding between trial arms, adjusting for prognostic variables (mother's education, maternal age, previous</p>	Standalone cot= 0/437	<p>exclusive breastfeeding between those who actually received a sidecar crib or a standalone cot, but was performed post hoc")</p> <p>Other sources of bias- High risk ("Of the 532 women randomised to the sidecar crib, 347 definitely received it, 129 did not and for 56 it was not known. Of the 539 women randomised to the standalone cot, 428 definitely received it, three did not and for 108 it was not known.")</p> <p>Other information</p> <p>Of the 1071 women in the trial at delivery, 870 (437 allocated to the sidecar and 433 allocated to the standalone cot) provided some follow-up data over 26 weeks, and 201 (18.8%) provided none. Table 2 compares women who provided some or no follow-up data. As expected, women who</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	or infants were transferred to special care.		<p>breastfeeding and delivery type), and to investigate the effect of age group (≤ 28 and $29+$ years) and delivery type for each trial arm on the primary outcomes, adjusting for the other prognostic variables.</p> <p>Exact partial likelihood was used to deal with ties in the dataset. Checks were made on the proportional hazard assumption. The proportion of women who bed shared in the first 13 weeks was compared between trial arms using binomial regression, adjusting for parity."</p>		provided data had more education, were older, less likely to live alone, and had higher gestational age at birth.
<p>Full citation Blair, P. S., Heron, J., Fleming, P. J., Relationship between bed sharing and breastfeeding: Longitudinal,</p>	<p>Sample size n=14 062 live births n=7447 data for all time points</p> <p>Characteristics</p>	<p>Interventions Non-bed sharing Constant bed sharing (throughout 4 years) Early bed sharing (only in first year) Late bed sharing (after the first year)</p>	<p>Details Recruitment: The study enrolled infants of all pregnant women who were residing in the 3 Bristol-based health districts of the county of Avon.</p>	<p>Results Multivariate Odds ratio (95% CI) of breastfeeding at 12 months: Late bed sharing: 1.69 (1.35-2.10)</p>	<p>Limitations Quality of study assessed using ROBINS-I Confounding bias: High risk (appropriate methods used to control for baseline confounding,</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>population-based analysis, Pediatrics, 126, e11119-e1126, 2010</p> <p>Ref Id 412333</p> <p>Country/ies where the study was carried out UK</p> <p>Study type Prospective longitudinal population based study</p> <p>Aim of the study Investigate the longitudinal patterns of bed sharing, the characteristics associated with those patterns, and the relationship with breastfeeding</p> <p>Study dates</p>	<p>Male: 51.7%</p> <p>Non-white: 3.3%</p> <p>>3 children: 5%</p> <p>Preterm (<37 weeks): 9.4%</p> <p>Low birth weight (<2500g): 3.7%</p> <p>Maternal social class I or II: 40.3%</p> <p>Maternal education (degree/level): 15.5%</p> <p>Young mother (<21y): 3.3%</p> <p>No partner: 1.7%</p> <p>Multiple birth (twins or triplets): 1.7%</p> <p>Maternal smoking: 45.8%</p> <p>Breastfeeding duration of >12 months: 10.6%</p> <p>Bedsharing 0-2 months: 9.2%, 6-8 months: 14%, 17-20 months: 15.8%, 30-33 months: 20.8%, 42-45 months: 18%</p> <p>Inclusion criteria Infants of all pregnant women who were residing in the 3 Bristol-based</p>		<p>Data collection: Information was collected initially from parent-completed questionnaires and from clinical records. Successive questionnaires and direct contacts collected information on a wide range of aspects of the lives, health, growth, and development of the infants in the study and their parents</p> <p>Outcomes: Bedsharing was defined as an infant or child usually spending some of the nocturnal sleep in the same bed as an adult. Breastfeeding information was collected at several time points; breastfeeding duration determined at 15 months (and verified against earlier information) was used for this analysis. More than 10% of the infants</p>	<p>Early bed sharing: 2.33 (1.87-2.89)</p> <p>Constant bed sharing: 5.21 (4.06-6.68)</p>	<p>but variables measured through self-report).</p> <p>Selection of participants' bias: High risk (participants analysed based on response to bed sharing questions).</p> <p>Classification of interventions bias: Low-risk (different classifications of bed-sharing was clearly defined).</p> <p>Deviations from intended interventions bias: NA (participants were not assigned to bed sharing, these were the bed sharing practices reported by the participants).</p> <p>Missing data bias: Moderate risk (unclear whether missing data similar across different bed sharing groups; missing data not included in the analysis).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Birth dates April 1, 1991-December 31, 1992 and followed up a 4 different time points from birth to 4 years of age</p> <p>Source of funding The UK Medical Research Council (grant 74882), the Wellcome Trust (grant 076467), and the University of Bristol provided core support for the Avon Longitudinal Study of Parents and Children. The research was specifically funded by the Foundation for the Study of Infant Deaths</p>	<p>health districts of the county of Avon with an expected delivery date between April 1, 1991, and December 31, 1992</p> <p>Exclusion criteria None reported</p>		<p>in the cohort were still breastfeeding at 12 months; therefore, this was used as a cut-off time to investigate significant markers of long-term breastfeeding.</p> <p>Follow-up: Data on the sleeping environment were collected at 8 time points (0–2 months, 6–8 months, 17–20 months, 30–33 months, 42–45 months, 69–72 months, 80–84 months, and 115–119 months) but, because bed sharing was relatively uncommon as a routine practice beyond 42 to 45 months, we concentrated on data from the first 5 time points in this analysis. To achieve consistent denominators across the time points and best estimates for the latent class approach, we opted to concentrate on the children whose parents</p>		<p>Selection of the reported results bias: Low risk (methods on data analyses pre-specified; adjusted ORs reported).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			<p>provided data on bed sharing for all 5 of the time points studied.</p> <p>Statistical methods: Longitudinal latent class analysis with stats package Mplus. Longitudinal latent class analysis is an exploratory technique that attempts to group the respondents into a number of unmeasured (latent) groups or mutually exclusive classes to explain the variability in response patterns. Various stopping criteria are used to establish the optimal number of classes (i.e., the minimal number of classes required to obtain an adequate model fit). Unlike cluster analysis, the longitudinal latent class analysis method works with probabilities rather than absolute values by providing a set of class-assignment</p>		

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			<p>probabilities for each person, allowing people to be fractional members of all classes to a lesser or greater degree. A series of models with an increasing number of classes are fitted, with the best model being chosen on the basis of the bootstrap likelihood ratio test, the Bayesian information criterion, and entropy, as well as the face validity of the resulting profiles of behaviour. The second stage of this procedure, the assessment of the relationship between the resulting latent classes and both covariates and later outcomes, was conducted by using probability weighted binary and multinomial logistic regression analyses within Stata 7 (Stata Corp, College Station, TX), including calculation of</p>		

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			<p>multinomial odds ratios (described in Stata as relative risk ratios)</p> <p>For the regression analyses, multivariate models were constructed by using the backward stepwise procedure for variables that were significant at the 5% level in univariate analyses. Any variables with >5% missing data were tested at the end of the modelling process.</p>		
<p>Full citation Brenner, R. A., Simons-Morton, B. G., Bhaskar, B., Revenis, M., Das, A., Clemens, J. D., Infant-parent bed sharing in an inner-city population, Archives of Pediatrics and Adolescent Medicine, 157, 33-39, 2003</p> <p>Ref Id</p>	<p>Sample size N=452 mothers (n=394 eligible mothers completed first follow-up interview; n=369 eligible mothers completed second follow-up interview). n usual bed sharing at ages 3 to 7 months = 178 n no usual bed sharing at ages 3 to 7 months = 191</p> <p>Characteristics Mother's age, years, number (%)</p>	<p>Interventions Usual bed sharing was defined as usually sleeping in a bed with a parent or other adult. Among the 369 infants with data from both interviews, more than 1 usual sleep condition was reported for 31 infants at ages 3 to 7 months. If 1 of the conditions included usually sleeping with a parent or adult, the</p>	<p>Details Recruitment: Mothers were recruited shortly after giving birth at 3 hospitals in the District of Columbia (2 hospitals had a high prevalence of low-income patients; enrolment at the third hospital was limited to mothers cared for by staff physicians to capture low-income, inner-city patients).</p>	<p>Results Adjusted odds ratio (OR) and 95% confidence intervals (CIs)</p> <p>Maternal depression at ages 3 to 7 months associated with usual bed sharing: 1.27 (0.96 to 1.68)</p>	<p>Limitations Quality of study assessed using ROBINS-I</p> <p>Confounding bias: High risk (appropriate methods used to control for baseline confounding, but confounding variables measured through self-report).</p> <p>Selection of participants' bias: High risk (participants analysed)</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>700287</p> <p>Country/ies where the study was carried out US</p> <p>Study type Prospective birth cohort.</p> <p>Aim of the study To assess sleep practices and factors associated with bed sharing in infants (born to predominantly low-income, inner-city mothers) during the first 7 to 12 months of life.</p> <p>Study dates Recruitment: August 1995 to September 1996 Follow-up: November 1995 to September 1997.</p> <p>Source of funding</p>	<p><20 = 97 (22) ≥20 = 354 (78)</p> <p>Maternal race, number (%) African American, non-Hispanic = 370 (82) Hispanic = 73 (16) Other = 9 (2)</p> <p>Household income (based on family income and size as per 1996 Health and Human Services poverty guidelines), number (%) Lower than poverty line = 289 (68) Higher than poverty line = 135 (32)</p> <p>Infant sex, number (%) Male = 237 (52) Female = 215 (48)</p> <p>Birth weight, g, number (%) 1800 to 2499 = 46 (10) ≥2500 = 404 (90)</p> <p>Birth mode, number (%)</p>	<p>infant was considered to be a usual bed sharer. No bed sharing.</p>	<p>Data collection: Mothers were interviewed shortly after giving birth, at 3 to 7 months post partum, and at 7 to 12 months post partum. Data were also collected from hospital records.</p> <p>Outcomes: The outcome of interest to this review is the association between bed sharing and maternal depression at ages 3 to 7 months (breastfeeding practices were reported, but adjusted data were not presented).</p> <p>Follow-up: 3 to 12 months post partum.</p> <p>Data analysis: For unadjusted analyses, associations between independent variables and outcomes were assessed using the chi-</p>		<p>based on response to co-sleeping questions).</p> <p>Classification of interventions bias: Low-risk (usual and no usual bed sharing groups clearly defined).</p> <p>Deviations from intended interventions bias: N/A (participants were not assigned to usual bed-sharing or no bed-sharing; these were the sleeping practices reported by the participants).</p> <p>Missing data bias: Low risk (data missing for 5 women at first follow-up; unclear whether missing data similar across different groups).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective).</p> <p>Selection of the reported results bias: Low risk</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Grants from the National Institutes of Health (NIH), National Institute of Child Health and Human Development and Office of Research on Minority Health; part of the NIH-DC Initiative to Reduce Infant Mortality in Minority Populations.	<p>Caesarean = 98 (22) Vaginal = 349 (78)</p> <p>Type of bed infant sleeps in usually at ages 3 to 7 months, number (%)</p> <p>Adult bed/mattress = 171 (43) Crib = 170 (43) Bassinet = 35 (9) Cradle = 2 (<1) Carry cot/travel bed = 2 (<1) Playpen = 7 (2) Floor = 1 (<1) Missing/don't know = 6 (2)</p> <p>Person infant sleeps with usually at ages 3 to 7 months, number (%)</p> <p>Alone = 201 (51) Parent = 157 (40) Other adult = 2 (<1) Child = 1 (<1) Alone/parent = 29 (7) Parent/other adult = 2 (<1) Alone/parent/child = 1 (<1)</p>		<p>squared test or Fisher exact test for categorical data, the Cochran-Armitage trend test for ordinal data, and the t-test for continuous data.</p> <p>Multivariate logistic regression was conducted to assess the association between those independent variables shown to be statistically significant ($p \leq 0.10$) in bivariate analyses and usual bed sharing.</p>		<p>(methods on data analysis pre-specified; adjusted and unadjusted ORs reported).</p> <p>Other information</p> <p>Mothers were provided with a layette set at enrolment and those who completed follow-up interviews were given \$25 for each interview.</p> <p>The study also reported data at ages 7 to 12 months, but these data are not reported in this review.</p> <p>*Usual bed sharing was assessed as the outcome; comparisons were between maternal depression versus no maternal depression.</p> <p>Data on maternal depression does not meet protocol criteria for parental emotional health and wellbeing (i.e. parental emotional health and wellbeing in the first 8 weeks after the birth).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	<p>Alone/child = 0 Parent/child = 0 Alone/other adult = 0 Missing/don't know = 1 (1) Inclusion criteria Mothers with singleton births, giving birth at 3 hospitals in the District of Columbia. Exclusion criteria Infants with birth weight <1800 g; Infants with major congenital malformations; Infants not placed in the mother's care after discharge from hospital; Mothers who were incarcerated at the time of baseline interview.</p>				
<p>Full citation Broussard, D. L., Sappenfield, W. M., Goodman, D. A., The Black and White of infant back sleeping and infant bed sharing in Florida, 2004-2005, Maternal & Child</p>	<p>Sample size N=2791 (n=1344 Black women; n=1447 White women) n never/rare bed sharing = 445 Black women; = 904 White women* n frequent bed sharing = 899 Black women; 543* p<0.0001</p>	<p>Interventions Infrequent bed sharing (defined as never or rarely). Frequent bed sharing (defined as always, often, or sometimes).</p>	<p>Details Recruitment: The Florida Pregnancy Risk Assessment Monitoring System (PRAMS) is a Centres for Disease Control and Prevention-developed, population-based surveillance system using a</p>	<p>Results Adjusted ORs (95% CIs) Breastfeeding** None: 1.00 (reference) ≤4 weeks: Black women = 4.02 (2.48 to 6.52), p<0.0001; White women = 1.22 (0.77 to 1.91), p=0.40</p>	<p>Limitations Quality of study assessed using ROBINS-I Confounding bias: High risk (appropriate methods used to control for baseline confounding, but confounding variables</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Health Journal, 16, 713-24, 2012</p> <p>Ref Id 568463</p> <p>Country/ies where the study was carried out US</p> <p>Study type Population-based cohort.</p> <p>Aim of the study To investigate the relationship between not using infant back sleeping position and infant bed sharing, and associations between these infant sleeping behaviours and maternal characteristics, behaviours, and experiences.</p>	<p>Characteristics</p> <p>Mother's age, years, %</p> <p><20: Black women = 15.6; White women = 9.3</p> <p>20 to 24: Black women = 36.1; White women = 22.8</p> <p>25 to 34: Black women = 38.7; White women = 51.8</p> <p>≥35: Black women = 9.6; White women = 16.1</p> <p>p<0.0001</p> <p>Parity, %</p> <p>0: Black women = 37.2; White women = 45.2</p> <p>1: Black women = 29.8; White women = 32.6</p> <p>>1: Black women = 33.0; White women = 22.2</p> <p>p<0.0001</p> <p>Method of payment for birth, %</p> <p>Private insurance: Black women = 15.3; White women = 31.0</p>		<p>stratified, random sampling methodology to select resident women on a monthly basis using records for births occurring 2 to 6 months previously.</p> <p>Data collection: Data on predominant sleep position, frequency of infant bed sharing were collected, and maternal characteristics, behaviours, and experiences were collected from birth certificates and PRAMS.</p> <p>A mailed questionnaire and a telephone follow-up questionnaire were used to collect data from mothers who did not respond or could not be contacted by mail.</p> <p>Outcomes: Association between maternal characteristics, behaviours, and experiences, including</p>	<p>>4 weeks: Black women = 5.84 (3.71 to 9.19), p<0.0001; White women = 2.65 (1.79 to 3.93), p<0.0001</p> <p>Partner-associated stress*** 1.56 (1.22 to 2.01); p<0.0001</p>	<p>measured through self-report).</p> <p>Selection of participants' bias: High risk (participants analysed based on response to co-sleeping questions).</p> <p>Classification of interventions bias: Low-risk (infrequent and frequent bed-sharing groups clearly defined).</p> <p>Deviations from intended interventions bias: N/A (participants were not assigned to infrequent and frequent bed-sharing; these were the co-sleeping practices reported by the participants).</p> <p>Missing data bias: Low risk (data missing for maternal age or education, n=28; unclear whether missing data similar across different groups).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Study dates 2004 to 2005.</p> <p>Source of funding Supported in part by an appointment to the Applied Epidemiology Programme administered by the Council of State and Territorial Epidemiologists (CSTE) funded by the Centres for Disease Control and Prevention (CDC) Co-operative Agreement.</p>	<p>Medicaid/public funding: Black women = 64.3; White women = 34.0</p> <p>Self-pay/other: Black women = 20.5; White women = 35.0 p<0.0001</p> <p>Breastfeeding, % None: Black women = 34.4; White women = 25.0 ≤4 weeks: Black women = 22.2; White women = 20.3 >4 weeks: Black women = 43.4; White women = 54.7 p<0.0001</p> <p>Inclusion criteria Women resident in Florida and giving birth to a live born infant.</p> <p>Exclusion criteria Hispanic women; Infants who died; Mother's whose infants did not live with them at the time of the survey;</p>		<p>duration of breastfeeding and infant bed sharing.</p> <p>Follow up: Not reported.</p> <p>Data analysis: Continuous variables (e.g. mother's age, parity, duration of breastfeeding, and time of first postnatal care visit) were operationalised as categorical variables. Bivariate analysis and chi-squared tests were used to assess associations between race, infant sleeping behaviours, and maternal characteristics.</p> <p>Multivariate logistic regression analyses were used to calculate unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals</p>		<p>Measurement of outcomes bias: High risk (outcome measures subjective).</p> <p>Selection of the reported results bias: Low risk (methods on data analysis pre-specified; adjusted and unadjusted ORs reported).</p> <p>Other information It was unclear whether partner-associated stress were assessed at the time points stated in the protocol (i.e. within the first 8 weeks after birth for parental emotional health and wellbeing). *Calculated by the NGA.</p> <p>**Comparisons between breastfeeding ≤4 weeks and >4 weeks versus no breastfeeding, partner-associated stress versus no partner-associated stress and the association with frequent bed sharing. ORs adjusted for mother's age, marital</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Women who did not provide data on sleep position or bed sharing practices, or did not provide data for maternal age or education.		(CIs) for the associations between high risk sleeping behaviours and maternal characteristics. Similar methods were used to examine separately the differences in maternal characteristics by race for each infant sleeping behaviour.		status, mother US born, partner-associated stress. ***ORs adjusted for race, mother's age, marital status, mother US born, first PNC visit, breastfeeding, depression during or after pregnancy.
Full citation Luijk, M. P. C. M., Mileva-Seitz, V. R., Jansen, P. W., van, IJzendoorn M. H., Jaddoe, V. W. V., Raat, H., Hofman, A., Verhulst, F. C., Tiemeier, H., Ethnic differences in prevalence and determinants of mother-child bed-sharing in early childhood, <i>Sleep Medicine</i> , 14, 1092-1099, 2013	Sample size N=6309 children (n=5095 at 2 months; n=5361 at 24 months) n bed-sharing = 1149/5095 n no bed-sharing = 3946/5095 Characteristics Maternal age, years, mean (SD) Dutch (n=3680) = 31.9 (4.2) Turkish and Moroccan (n=697) = 28.2 (5.1) Caribbean (n=539) = 28.6 (5.9)	Interventions Bed-sharing defined as the child sharing a bed with the mother or both parents. No bed-sharing defined as children who spent the majority of the night in their own bed.	Details Recruitment: Participants were invited to participate in the study by their midwife or obstetrician during routine prenatal visits. Data collection: data on maternal baseline characteristics and infant sleep practices were obtained from medical records and through prenatal and postnatal questionnaires. In case	Results *Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) Breastfeeding associated with bed-sharing at 2 months: 1.77 (1.42 to 2.21; p<0.05) Maternal depressive symptoms associated with bed-sharing at 2 months: 1.19 (0.94 to 1.51)	Limitations Quality of study assessed using ROBINS-I Confounding bias: High risk (appropriate methods used to control for baseline confounding, but confounding variables measured through self-report). Selection of participants' bias: High risk (participants analysed based on response to sleeping questions).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Ref Id 806649</p> <p>Country/ies where the study was carried out The Netherlands</p> <p>Study type Prospective population-based cohort study.</p> <p>Aim of the study To assess bed-sharing in a large multi-ethnic population and to explore the influence of socio-demographic, contextual factors (such as breastfeeding, maternal mental health and stress), and child temperament and sleep habits on bed-sharing at 2 and 24 months.</p>	<p>Parity, multiparous, % Dutch = 42.6 Turkish and Moroccan = 56.5 Caribbean = 41.7 Gestational age at birth, weeks, mean (SD) Dutch = 39.8 (1.8) Turkish and Moroccan = 40.0 (1.7) Caribbean = 39.5 (1.8) Child sex (female), % Dutch = 49.6 Turkish and Moroccan = 48.8 Caribbean = 48.6 Inclusion criteria Pregnant women living in Rotterdam with expected birth dates between April 2002 and January 2006. Exclusion criteria Not stated.</p>		<p>of illiteracy or low education, trained research assistants helped with completion of questionnaires. Outcomes: Bed-sharing practices; maternal depression; breastfeeding status; maternal confidence; parental stress; neonatal behaviour (unsettled-irregular behaviour and alertness-responsiveness) sleep problems, and child anxiety.</p> <p>Follow up: 2 and 24 months.</p> <p>Data analysis: 2 binary logistic regression analyses were conducted to explore the predictors of bed-sharing versus no bed-sharing at 2 and 24 months, and stratified by ethnicity.</p>		<p>Classification of interventions bias: Low-risk (bed-sharing and no bed-sharing groups clearly defined).</p> <p>Deviations from intended interventions bias: N/A (participants were not assigned to bed-sharing or no bed-sharing; these were the sleeping practices reported by the participants).</p> <p>Missing data bias: Low risk (missing data on predictor variables ranged from 0% to 11%, missing data were imputed; non-response analysis was conducted where data were missing on one of the assessments of sleeping practices).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective). Selection of the reported results bias: Low risk (methods on data analysis)</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Study dates April 2002 to January 2006.</p> <p>Source of funding As part of the Generation R Study, the first phase was supported by the Erasmus Medical Centre Rotterdam, the Erasmus University of Rotterdam and the Netherlands Organisation for Health Research and Development. Additional grants from the Netherlands Organisation for Scientific Research.</p>			<p>In secondary analysis, multinomial logistic regression analyses were conducted to calculate the odds of belonging to one of three bed-sharing practice groups versus non bed-sharing. Missing data were imputed for all predictor variables in the model. All predictors and the outcome were used as predictors in the multiple imputation models. The outcome was not imputed.</p> <p>Non-response analysis was performed to compare children with missing data on one assessment of sleep practices (n=1584) versus children for whom data were available (n=6309).</p>		<p>pre-specified; adjusted and unadjusted ORs reported).</p> <p>Other information The study presented data at 24 months, but these data are not included in this evidence review.</p> <p>Data on breastfeeding at 2 months does not meet protocol criteria for this outcome (i.e. breastfeeding at 6 and 12 weeks, and 6 months).</p> <p>*ORs adjusted for maternal and child predictors. Comparisons between breastfeeding versus no breastfeeding and maternal depressive symptoms versus no maternal depressive symptoms associated with bed-sharing at 2 months.</p> <p>Linked to Mileva-Seitz (2016).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Full citation McCoy, R. C., Hunt, C. E., Lesko, S. M., Vezina, R., Corwin, M. J., Willinger, M., Hoffman, H. J., Mitchell, A. A., Frequency of bed sharing and its relationship to breastfeeding, Journal of Developmental and Behavioral Pediatrics, 25, 141-149, 2004</p> <p>Ref Id 1011785</p> <p>Country/ies where the study was carried out US</p> <p>Study type Prospective multicentre cohort study.</p> <p>Aim of the study</p>	<p>Sample size N=15113 mother-infant pairs (data available for all three follow-up periods n=10355 mother-infant pairs; 43% mother-infant pairs excluded as they could not be contacted, 30% lost to follow-up, 22% refused one interview, 4% withdrew from the study. 7 infants died before the 6-month follow-up. *n bed sharing = 1450 at 3 months; 1346 at 6 months *n no bed sharing = 8905 at 3 months; 9009</p> <p>Characteristics Mother's race/ethnicity, number (%) White, non-Hispanic = 8006 (77.3) Black, non-Hispanic = 897 (8.7) Hispanic = 911 (8.8) Asian = 417 (4.0) Other = 124 (1.2)</p>	<p>Interventions Bed-sharing defined as an infant sharing a bed with someone (parent(s), other adult(s), other child(ren)) for most of the previous night. No bed-sharing defined as an infant who slept alone.</p>	<p>Details Recruitment: Mothers of newborn infants were contacted and invited to participate at selected hospitals in Boston, Lowell, and Lawrence, Massachusetts, and Toledo, Ohio. Data collection: Mother and infant baseline characteristics were collected at enrolment and information on sudden infant death syndrome (SIDS) risk factors were collected by interview. Follow-up data were collected by mailed questionnaire and mothers not responding were interviewed by telephone. Outcomes: Bed-sharing and feeding practices at each follow-up period.</p>	<p>Results *Adjusted ORs and 95% CIs Breastfeeding at 3 months = 3.4 (2.9 to 4.0) Breastfeeding at 6 months = 3.6 (3.0 to 4.2)</p>	<p>Limitations Quality of study assessed using ROBINS-I Confounding bias: High risk (appropriate methods used to control for baseline confounding, but confounding variables measured through self-report). Selection of participants' bias: High risk (participants analysed based on response to sleeping questions). Classification of interventions bias: Low-risk (bed-sharing and no bed-sharing groups clearly defined). Deviations from intended interventions bias: N/A (participants were not assigned to bed-sharing or no bed-sharing; these were the sleeping</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>To determine the prevalence of adult and infant bed sharing and the relationship with maternal and infant characteristics.</p> <p>Study dates February 1995 to December 1998.</p> <p>Source of funding National Institute of Child Health and Human Development and National Institute on Deafness and Other Communicative Disorders, National Institutes of Health.</p>	<p>Mother's age, years, number (%) 14 to 17 = 331 (3.2) 18 to 24 = 1922 (18.6) 25 to 34 = 5685 (54.9) ≥35 = 1893 (18.3)</p> <p>Household income, number (%) <\$16000 = 1128 (10.9) \$16000 to \$34999 = 1544 (14.9) \$35000 to \$54999 = 2091 (20.2) ≥\$55000 = 4333 (41.8)</p> <p>Parity, number (%) 1 = 4615 (44.6) 2 = 3492 (33.7) 3 or more = 2240 (21.6)</p> <p>Infant birth weight, g, number (%) ≥2500 = 9773 (94.4) <2500 = 582 (5.6)</p> <p>Inclusion criteria</p>		<p>Follow up: 1, 3 and 6 months of age.</p> <p>Data analysis: Univariate analysis was conducted to identify associations between various factors (e.g. marital status, breastfeeding status, parity) and bed sharing. Multiple logistic regression analyses were conducted to examine the independent association of various factors with bed sharing whilst controlling for potential confounders. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated).</p>		<p>practices reported by the participants).</p> <p>Missing data bias: High risk (follow-up data available for 69% women, unclear whether results robust to presence of missing data).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective).</p> <p>Selection of the reported results bias: Low risk (methods on data analysis pre-specified; adjusted and unadjusted ORs reported).</p> <p>Other information Breastfeeding was defined as any breastfeeding in the past 24 hours. Data were also presented for one month follow-up, but are not presented in this review.</p> <p>*Calculated by the NGA.</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	<p>Mothers of newborn infants at selected hospitals.</p> <p>Exclusion criteria Not stated.</p>				<p>**ORs controlled for race/ethnicity, maternal age, marital status, maternal education, household income, infant postnatally exposed to tobacco smoke, language spoken at home, parity, season, enrolment site, and year of birth. Comparison between breastfeeding versus no breastfeeding associated with bed sharing with a parent.</p>
<p>Full citation Mileva-Seitz, V. R., Luijk, M. P. C. M., van Ijzendoorn, M. H., Bakermans-Kranenburg, M. J., Jaddoe, V. W. V., Hofman, A., Verhulst, F. C., Tiemeier, H., Association between infant nighttime-sleep location and attachment security: No easy verdict, Infant Mental Health</p>	<p>Sample size N=552 N frequent bed-sharing = 67 N some bed-sharing = 178 N solitary sleeping = 307 Characteristics Maternal age, years, mean (SD) Frequent bed-sharing: 32.65 (4.17) Some bed-sharing: 31.92 (3.78) Solitary sleeping: 31.53 (3.67)</p>	<p>Interventions Never bed shared (solitary sleepers) Bed-sharing (some bed-sharing (i.e. between once a month and up to 3 times a week) and frequent bed-sharing (4 times a week))</p>	<p>Details Recruitment: Pregnant women living in Rotterdam and with an expected birth date between April 2002 and January 2006 were recruited by their midwife or obstetrician during routine prenatal visits. Data collection: Sleeping practices in the past 2 months were collected using a parental</p>	<p>Results *Adjusted ORs (95% CIs) Insecure versus secure attachment Solitary sleeping: 1.50 (1.0 to 2.20); p<0.05 Some bed-sharing: 0.65 (0.43 to 0.99); p<0.05 Frequent bed-sharing: 0.73 (0.40 to 1.33) Disorganised versus non-disorganised attachment</p>	<p>Limitations Quality of study assessed using ROBINS-I Confounding bias: High risk (appropriate methods used to control for baseline confounding, but confounding variables measured through self-report). Selection of participants' bias: High risk (participants analysed based on response to sleeping questions).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Journal, 37, 5-16, 2016</p> <p>Ref Id 1011821</p> <p>Country/ies where the study was carried out The Netherlands</p> <p>Study type Prospective population-based cohort study.</p> <p>Aim of the study To assess the association between nighttime parenting practices at 2 months (including bed-sharing and types of comforting used by parents) and children's attachment security at 14 months.</p> <p>Study dates</p>	<p>Parity (firstborn), number (%)</p> <p>Frequent bed-sharing: 37 (55.2)</p> <p>Some bed-sharing: 95 (53.4)</p> <p>Solitary sleeping: 221 (71.5)</p> <p>Child sex, male, number (%)</p> <p>Frequent bed-sharing: 38 (56.7)</p> <p>Some bed-sharing: 89 (50.0)</p> <p>Solitary sleeping: 157 (50.6)</p> <p>Breastfeeding at 2 months, number (%)</p> <p>Frequent bed-sharing: 55 (82.1)</p> <p>Some bed-sharing: 122 (68.5)</p> <p>Solitary sleeping: 196 (63.2)</p>		<p>questionnaire relating to place of sleep and frequency of bed-sharing. Attachment data were collected using the modified Strange Situation Procedure (7 x 3 minute episodes designed to evoke mild stress in the infant to trigger attachment behaviour). Data on attachment security were also collected using the continuous Richters, Waters, and Vaughn score of secure attachment.</p> <p>Outcomes: Association between bed-sharing and attachment security.</p> <p>Follow-up: 14 months.</p> <p>Data analysis: Analyses were conducted initially to assess the association between any bed-</p>	<p>Solitary sleeping: 1.30 (0.83 to 2.04)</p> <p>Some bed-sharing: 0.73 (0.45 to 1.20)</p> <p>Frequent bed-sharing: 0.88 (0.44 to 1.77)</p>	<p>Classification of interventions bias: Low-risk (bed-sharing and never bed-shared groups clearly defined).</p> <p>Deviations from intended interventions bias: N/A (participants were not assigned to bed-sharing or never bed-shared; these were the sleeping practices reported by the participants).</p> <p>Missing data bias: Low risk (data missing for disorganised versus non-disorganised attachment groups n=25; unclear whether missing data similar across groups).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective).</p> <p>Selection of the reported results bias: Low risk (methods on data analysis pre-specified; adjusted</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>April 2002 to January 2006.</p> <p>Source of funding See Luijk (2013).</p>	<p>Maternal depressive symptoms at 2 months, mean (SD)</p> <p>Frequent bed-sharing: 0.17 (0.30)</p> <p>Some bed-sharing: 0.14 (0.34)</p> <p>Solitary sleeping: 0.11 (0.23)</p> <p>Inclusion criteria Children of Dutch national origin (i.e. their parents, and grandparents were born in The Netherlands).</p> <p>Exclusion criteria Not stated.</p>		<p>sharing versus solitary sleeping and continuous and categorical attachments. Followed by assessment of the association between different types of bed-sharing (frequent bed-sharing, some bed-sharing, and solitary sleeping).</p> <p>For continuous measures of attachment, linear regression was used. For categorical measures of attachment, logistic and multinomial regression was used and covariates entered into the models (i.e. parental-care components and sleep location).</p>		<p>and unadjusted ORs reported).</p> <p>Other information Bed-sharing was defined as the child sharing a bed with the mother (or both parents) for a part or the whole of the night. Attachment behaviours were categorised as secure or insecure and by level of disorganisation. When stressed, secure infants seek comfort from their mothers; avoidant infants turn away or ignore mothers; resistant infants are ambivalent about contact.</p> <p>*ORs adjusted for maternal age, maternal education, parity, maternal depression, breastfeeding at 2 months, breastfeeding duration, perceived infant temperament, and crowding in the home.</p> <p>Comparisons between insecure versus secure and disorganised versus</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					non-disorganised with sleep practice (solitary sleeping, some bed-sharing, frequent bed-sharing). Linked to Luijk (2013).
<p>Full citation Moon, R. Y., Mathews, A., Joyner, B. L., Oden, R. P., He, J., McCarter, R., Impact of a Randomized Controlled Trial to Reduce Bedsharing on Breastfeeding Rates and Duration for African-American Infants, Journal of community health, 42, 707-715, 2017</p> <p>Ref Id 986050</p> <p>Country/ies where the study was carried out USA</p>	<p>Sample size N= 1194</p> <p>Characteristics Baseline characteristics not reported per arm</p> <p>Age, years, mean (range)= 26.4 (18-42)</p> <p>Maternal education, n Did not graduate high school= 149 High school graduate/GED= 815 Technical or vocational school graduate= 31 4-year college graduate= 199</p> <p>Inclusion criteria English-speaking, self-identified African-American women who</p>	<p>Interventions Intervention: The intervention group received enhanced messaging emphasizing the need to follow AAP-recommended safe sleep practices (including room sharing without bed sharing) for both SIDS risk reduction and suffocation prevention. Control: The control group received standard messaging emphasizing AAP-recommended safe sleep practices (including room sharing without bed sharing) for the</p>	<p>Details Recruitment: English-speaking, self-identified African-American women who had just given birth to an infant were recruited.</p> <p>Data collection: Participants completed surveys relating to current intent on feeding and sleep location, demographics, and presence of other adults in the home. First interviews were completed when the infant was 1 to 2 days old.</p> <p>Outcomes: Feeding type (breast milk, formula, or both) and infant sleep location</p>	<p>Results Exclusive breastfeeding at 2-3 months of age Bedsharing= 61/160 Room sharing without bed sharing= 221/763</p> <p>Exclusive breastfeeding at 5-6 months of age Bedsharing= 88/179 Room sharing without bed sharing= 178/349</p> <p>Partial breastfeeding at 2-3 months of age Bedsharing= 35/160 Room sharing without bed sharing= 90/763</p> <p>Partial breastfeeding at 5-6 months of age</p>	<p>Limitations The quality assessment was performed using the Cochrane risk of bias tool for RCTs Random sequence generation- Unclear risk (method of randomisation not reported)</p> <p>Allocation concealment- Unclear risk (method of allocation concealment not reported)</p> <p>Blinding of participants and personnel- High risk (not possible to blind participants or personnel involved with the conduct of the trial)</p> <p>Blinding of outcome assessment- Low risk ("Research staff who were</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Study type Single-blinded RCT</p> <p>Aim of the study The objective was to determine impact of sleep location and counselling about sleep location on breastfeeding exclusivity and duration in African-Americans.</p> <p>Study dates Not stated. Source of funding Maternal and Child Health Bureau, Health Resources Service Administration 1R40MC21511 and the National Institute for Minority Health and Health Disparities P20MD000198.</p>	<p>had just delivered an infant.</p> <p>Exclusion criteria Infant was preterm (<36 weeks) at birth, was hospitalized for >1 week, or had ongoing medical problems requiring subspecialty care</p>	<p>purposes of SIDS risk reduction.</p>	<p>during the past week and for the night prior to each interview.</p> <p>Follow up: At 2 to 3 weeks, 2 to 3 months and 5 to 6 months.</p> <p>Data analysis: Analyses of covariance were conducted to estimate the change in practice in the two intervention groups, controlling for baseline data. Longitudinal logistic regression models were used to assess the post-intervention time-averaged group wise differences measured across the 3 time points. Usual and last night practices were analysed separately.</p>	<p>Bedsharing= 56/179 Room sharing without bed sharing= 81/349</p> <p>Any breastfeeding, adjusted for infant age, maternal age, maternal education, medical insurance and number of people in home, odds ratio (95% CI), p-value Bedsharing= 1.32 (0.98-1.78), 0.067 Room sharing without bed sharing= reference</p> <p>Exclusive breastfeeding, adjusted for infant age, maternal age, maternal education, medical insurance and number of people in home, odds ratio (95% CI), p-value Bedsharing= 1.04 (1.02-1.06), < 0.001 Room sharing without bed sharing= reference</p>	<p>blinded to study group assignment then contacted participants for three follow-up telephone interviews about current infant care practices")</p> <p>Incomplete outcome data- Low risk</p> <p>Selective reporting- High risk (Study performed post-hoc analyses that were not listed in the Methods)</p> <p>Other sources of bias- Low risk</p>
Full citation	Sample size	Interventions	Details	Results	Limitations

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Smith, L. A., Geller, N. L., Kellams, A. L., Colson, E. R., Rybin, D. V., Heeren, T., Corwin, M. J., Infant Sleep Location and Breastfeeding Practices in the United States, 2011-2014, Academic Pediatrics, 16, 540-549, 2016</p> <p>Ref Id 1012146</p> <p>Country/ies where the study was carried out US</p> <p>Study type Cohort study.</p> <p>Aim of the study To assess the prevalence of breastfeeding and sleep location</p>	<p>N=3983 mothers (n=3297 mothers completed follow-up survey; n=3218 responded to the questions required for the study)</p> <p>n bed sharing = 686 n no bed sharing = 2532</p> <p>Characteristics</p> <p>Mother's age, number (%)</p> <p><20 = 264 (7.4) 20 to 29 = 1743 (51.9) ≥30 = 1211 (40.7)</p> <p>Race, number (%)</p> <p>White = 1263 (53.0) Black = 803 (12.8) Hispanic = 876 (25.4) Other = 275 (8.8)</p> <p>Household income, number (%)</p> <p><\$20000 = 1114 (29.1) \$20000 to 49000 = 814 (24.6) ≥\$50000 = 570 (20.0) Unknown = 720 (26.4)</p>	<p>Bed sharing whole or part of the night.</p> <p>No bed sharing defined as sleeping in parents' room, but in his or her own bed, or separate room.</p>	<p>Recruitment: In March 2010, 32 intrapartum hospitals were recruited based on American Hospital Association data. During January 2011 to March 2014, hospitals were assigned targets for sampling different ethnic groups and enrolment. Recruitment periods were organised into 3 cycles resulting in at least 250 completed surveys per cycle for each ethnic group.</p> <p>Data collection: Mothers completed follow-up surveys either online or by telephone.</p> <p>Outcomes: Infant care practices (feeding, sleep location, sleep surface).</p> <p>Follow up: Not reported.</p>	<p>* Adjusted OR and 95% CI for bed sharing whole or part of the night versus room share without bed sharing</p> <p>Exclusive breastfeeding in past 2 weeks = 2.46 (1.76 to 3.45)</p> <p>Partial breast milk in past 2 weeks = 1.75 (1.33 to 2.31)</p>	<p>Quality of study assessed using ROBINS-I</p> <p>Confounding bias: High risk (appropriate methods used to control for baseline confounding, but confounding variables measured through self-report).</p> <p>Selection of participants' bias: High risk (participants analysed based on response to sleeping questions).</p> <p>Classification of interventions bias: Low-risk (bed-sharing and no bed-sharing groups clearly defined).</p> <p>Deviations from intended interventions bias: N/A (participants were not assigned to bed-sharing or no bed-sharing; these were the sleeping practices reported by the participants).</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>practices among US mothers and factors associated with these behaviours.</p> <p>Study dates March 2010 to March 2014.</p> <p>Source of funding National Institute of Child Health and Human Development (NICHD).</p>	<p>Infant age, weeks, number (%)</p> <p>8 to 11 = 1997 (63.5)</p> <p>12 to 15 = 543 (16.8)</p> <p>16 to 19 = 307 (9.1)</p> <p>≥20 = 371 (10.6)</p> <p>Infant sex, number (%)</p> <p>Male = 1646 (50.8)</p> <p>Female = 1568 (49.2)</p> <p>Birth weight, g, number (%)</p> <p><2500 = 193 (5.5)</p> <p>≥2500 = 3006 (94.5)</p> <p>Parity, number (%)</p> <p>1 = 1182 (37.7)</p> <p>2 = 1072 (33.8)</p> <p>≥3 = 955 (28.5)</p> <p>Inclusion criteria Mothers who spoke English or Spanish and were living in the US; Caring for infant by 2 to 4 months after birth.</p> <p>Exclusion criteria</p>		<p>Data analysis: Data were weighted to account for sampling probabilities and drop out. Generalised logit models were used to calculate adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for associations between demographic variables, infant care practices and advice received, and each of 3 feeding practice categories (only breastfeeding, partial breastfeeding, and no breastfeeding) and sleep locations (room sharing but not bed sharing, separate room, and bed sharing for all or part of the night).</p>		<p>Missing data bias: Moderate risk (81% provided sufficient data for study analysis).</p> <p>Measurement of outcomes bias: High risk (outcome measures subjective).</p> <p>Selection of the reported results bias: Low risk (methods on data analysis pre-specified; adjusted and unadjusted ORs reported).</p> <p>Other information Exclusive breastfeeding defined as only breast milk, whether by breast or bottle).</p> <p>Partial breastfeeding defined as mostly breast milk, equally breast milk and formula, and mostly formula).</p> <p>*ORs were adjusted for geographic region, baby's age and birth weight, parity, mother's age, education, and race.</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Mothers not expected to be caring for their infant at 2 to 4 months of age due to, for example, infant's prolonged hospitalisation or social service placement.				

CI: confidence interval; GED: General Education Development; NA: not applicable; NIHR: National Institute for Health Research; OR: odds ratio; PRAMS: Pregnancy Risk Assessment Monitoring System; SD: standard deviation; SIDS: sudden infant death syndrome; RCTs: randomised controlled trials; ROBINS-I: Risk of Bias Tool to Assess Non-randomised Studies of Interventions.

Appendix E – Forest plots

Forest plots for review question: What are the benefits and harms of co-sleeping?

No meta-analysis was conducted for this review question and so there are no forest plots.

Appendix F – GRADE tables

GRADE tables for review question: What are the benefits and harms of co-sleeping?

Table 4: Clinical evidence profile for comparison shared sleep surface to no shared sleep surface - RCTs

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Shared sleep surface	no shared sleep surface	Relative (95% CI)	Absolute (95% CI)		
Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months - 6 weeks – side-car crib versus standalone cot												
1 (Ball 2011)	randomised trials	very serious ¹	no serious inconsistency	serious ²	serious ³	none	189/433 (43.6%)	194/437 (44.4%)	OR 0.97 (0.74 to 1.27)	8 fewer per 1,000 (from 73 fewer to 60 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months - 6 weeks – often bed sharing versus rarely bed sharing												
1 (Ball 2016)	randomised trials	very serious ^{1,4}	no serious inconsistency	serious ²	very serious ⁵	none	114/187 (61.0%)	105/299 (35.1%)	OR 2.89 (1.98 to 4.21)	259 more per 1,000 (from 166 more to 344 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months - 12 weeks – side-car crib versus standalone cot												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Shared sleep surface	no shared sleep surface	Relative (95% CI)	Absolute (95% CI)		
1 (Ball 2011)	randomised trials	very serious ¹	no serious inconsistency	serious ²	very serious ⁴	none	138/433 (31.9%)	128/437 (29.3%)	OR 1.13 (0.85 to 1.51)	26 more per 1,000 (from 32 fewer to 92 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months - 12 weeks – often bed sharing versus rarely bed sharing												
1 (Ball 2016)	randomised trials	very serious ^{1,4}	no serious inconsistency	serious ²	serious ³	none	88/187 (47.1%)	69/299 (23.1%)	OR 2.96 (2.00 to 4.39)	240 more per 1,000 (from 144 more to 338 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months - 6 months – side-car crib versus standalone cot												
1 (Ball 2011)	randomised trials	very serious ¹	no serious inconsistency	serious ²	very serious ⁴	none	12/433 (2.8%)	12/437 (2.7%)	OR 1.01 (0.45 to 2.27)	0 more per 1,000 (from 15 fewer to 33 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (exclusively) at 6 weeks, 12 weeks and 6 months - 6 months - bed sharing versus not bed sharing												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Shared sleep surface	no shared sleep surface	Relative (95% CI)	Absolute (95% CI)		
1 (Ball 2016)	randomised trials	very serious ^{1,4}	no serious inconsistency	serious ²	very serious ⁴	none	17/187 (9.1%)	15/299 (5.0%)	OR 1.89 (0.92 to 3.89)	41 more per 1,000 (from 4 fewer to 120 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months - 6 weeks – side-car crib versus standalone cot												
1 (Ball 201)	randomised trials	very serious ¹	no serious inconsistency	serious ²	serious ³	none	324/433 (74.8%)	332/437 (76.0%)	OR 0.94 (0.69 to 1.28)	11 fewer per 1,000 (from 74 fewer to 42 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months - 6 weeks - often bed sharing versus rarely bed sharing												
1 (Ball 2016)	randomised trials	very serious ^{1,4}	no serious inconsistency	serious ²	no serious imprecision	none	174/187 (93.0%)	194/299 (64.9%)	OR 7.24 (3.93 to 13.35)	282 more per 1,000 (from 230 more to 312 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months - 12 weeks – side-car crib versus standalone cot												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Shared sleep surface	no shared sleep surface	Relative (95% CI)	Absolute (95% CI)		
1 (Ball 2011)	randomised trials	very serious ¹	no serious inconsistency	serious ²	serious imprecision ³	none	290/433 (59.2%)	280/437 (41.8%)	OR 1.14 (0.86 to 1.5)	30 more per 1,000 (from 35 fewer to 87 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months - 12 weeks - often bed sharing versus rarely bed sharing												
1 (Ball 2016)	randomised trials	very serious ^{1,4}	no serious inconsistency	serious ²	no serious imprecision	none	161/187 (86.1%)	152/299 (50.8%)	OR 5.99 (3.73 to 9.60)	353 more per 1,000 (from 286 more to 400 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months - 6 months – side-car crib versus standalone cot												
1 (Ball 2011)	randomised trials	very serious ¹	no serious inconsistency	serious ²	serious ³	none	204/433 (47.1%)	222/437 (50.8%)	OR 0.86 (0.66 to 1.13)	38 fewer per 1,000 (from 103 fewer to 30 more)	VERY LOW	CRITICAL
Proportion of women breastfeeding (partially) at 6 weeks, 12 weeks and 6 months - 6 months - often bed sharing versus rarely bed sharing												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Shared sleep surface	no shared sleep surface	Relative (95% CI)	Absolute (95% CI)		
1 (Ball 2016)	randomised trials	very serious ^{1,4}	no serious inconsistency	serious ²	serious imprecision ³	none	131/187 (70.1%)	105/299 (35.1%)	OR 4.32 (2.92 to 6.40)	349 more per 1,000 (from 261 more to 425 more)	VERY LOW	CRITICAL
Serious illness in the baby - adverse events (not defined) - Side-car crib or mother's bed versus standalone cot												
2 (Ball 2006, Ball 2011)	randomised trials	very serious ^{1,6}	no serious inconsistency	serious ²	serious imprecision ⁷	none	0/474 (0.0%)	0/457 (0.0%)	RD 0.00 (-0.01 to 0.01)	0 fewer per 1,000 (from 10 fewer to 10 more)	VERY LOW	IMPORTANT
Parental satisfaction - maternal satisfaction, scale not reported, higher scores indicate higher satisfaction - Mother's bed or side-car crib versus stand-alone cot												
1 (Ball 2006)	randomised trials	serious ⁶	no serious inconsistency	serious ²	serious ⁸	none	41	20	-	MD 0.36 higher (0.1 lower to 0.82 higher)	VERY LOW	IMPORTANT

CI: Confidence interval; OR: Odds ratio; MD: Mean difference; RD: Risk Difference

¹Quality of evidence downgraded by 2 due to unclear methods of randomisation and allocation concealment, non-blinding of participants and investigators could have had an impact on outcomes, it was unknown in a proportion of participants from each arm whether they received their allocated sleeping device (Ball 2011).

²Quality of evidence downgraded by 1 due to indirectness in the study population - unknown whether co-sleeping with the baby on a shared sleep surface took place within the first 8 weeks after birth.

³Quality of the evidence was downgraded by 1 due to serious imprecision as the 95% CI interval crosses the line of no effect or there are fewer than 300 events in each group.

⁴Additional risk of bias due to missing data (Ball 2016)

⁵The quality of the evidence was downgraded by 2 due to very serious imprecision as the 95% CI interval crosses the line of no effect and there are fewer than 300 events in each group.

⁶Quality of evidence downgraded by 1 due to lack of blinding for participants and investigators which could have affected the subjective outcome assessments and concerns regarding selection bias due to incomplete outcome reporting (Ball 2006).

⁷Quality of the evidence was downgraded by 1 due to serious imprecision as the 95% CI interval crosses the line of no effect

⁸Quality of evidence was downgraded by 1 due to 95% CI crossing 1 default MID (-0.5 SD control, +0.5 SD control).

Table 5: Clinical evidence profile for comparison shared sleep surface versus no shared sleep surface – observational studies

No of studies	Design	Quality assessment					No of patients		Effect		Quality	Importance
		Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Bed sharing	No bed sharing	Relative (95% CI)	Absolute		
Exclusive breastfeeding in past 2 weeks												
1 (Smith 2016)	observational studies	very serious ¹	no serious inconsistency	no serious indirectness	no serious imprecision	none	686	2152	aOR 2.46 (1.76 to 3.44)	not calculable ²	VERY LOW	CRITICAL
Partial breastfeeding in past 2 weeks												
1 (Smith 2016)	observational studies	very serious ¹	no serious inconsistency	no serious indirectness	no serious imprecision	none	686	2152	aOR 1.75 (1.33 to 2.30)	not calculable ²	VERY LOW	CRITICAL
Proportion of women breastfeeding (exclusively) at 5-6 months												
1 (Moon 2017)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	no serious imprecision	none	179	349	aOR 1.04 (1.02 to 1.06)	not calculable ²	VERY LOW	CRITICAL
Proportion of women breastfeeding (any) at 5-6 months												
1 (Moon 2017)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	serious ⁴	none	179	349	aOR 1.32 (0.98-1.78)	not calculable ²	VERY LOW	CRITICAL
Breastfeeding at 12 months – late bed sharing versus no bed sharing												
1 (Blair 2010)	observational studies	very serious ³	no serious inconsistency	serious ⁵	no serious imprecision	none	112	4915	aOR 1.69 (1.35 to 2.10)	not calculable ²	VERY LOW	CRITICAL
Breastfeeding at 12 months – Early bed sharing versus no bed sharing												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Bed sharing	No bed sharing	Relative (95% CI)	Absolute		
1 (Blair 2010)	observational studies	very serious ³	no serious inconsistency	serious ⁵	no serious imprecision	none	968	4915	aOR 2.33 (1.87 to 2.89)	not calculable ²	VERY LOW	CRITICAL
Breastfeeding at 12 months – Constant bed sharing versus no bed sharing												
1 (Blair 2010)	observational studies	very serious ³	no serious inconsistency	Serious ⁵	no serious imprecision	none	447	4915	aOR 5.21 (4.06 to 6.68)	not calculable ²	VERY LOW	CRITICAL
Emotional attachment at 14 months - Secure (versus insecure attachment) – sometimes bed shared or frequently bed shared versus never bed shared												
1 (Mileva-Seitz 2016)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	serious ⁴	none	245	307	aOR 1.50 (1.00 to 2.25)	not calculable ²	VERY LOW	IMPORTANT
Emotional attachment at 14 months - Disorganised (versus non-disorganised attachment) - sometimes bed shared or frequently bed shared versus never bed shared												
1 (Mileva-Seitz 2016)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	serious ⁴	none	245	307	aOR 1.30 (0.83 to 2.04)	not calculable ²	VERY LOW	IMPORTANT
Emotional attachment at 14 months - Secure (versus insecure attachment) - frequently bed shared versus never bed shared												
1 (Mileva-Seitz 2016)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	serious ⁴	none	67	307	aOR 0.73 (0.40 to 1.33)	not calculable ²	VERY LOW	IMPORTANT
Emotional attachment at 14 months - Disorganised (versus non-disorganised attachment) - frequently bed shared versus never bed shared												
1 (Mileva-Seitz 2016)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	serious ⁴	none	67	307	aOR 0.88 (0.44 to 1.76)	not calculable ²	VERY LOW	IMPORTANT
Emotional attachment at 14 months - Secure (versus insecure attachment) - sometimes bed shared versus never bed shared												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Bed sharing	No bed sharing	Relative (95% CI)	Absolute		
1 (Mileva-Seitz 2016)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	Serious ⁴	none	178	307	aOR 0.65 (0.43 to 0.98)	not calculable ²	VERY LOW	IMPORTANT
Emotional attachment at 14 months - Disorganised (versus non-disorganised attachment) - sometimes bed shared versus never bed shared												
1 (Mileva-Seitz 2016)	observational studies	very serious ³	no serious inconsistency	no serious indirectness	serious ⁴	none	178	307	aOR 0.73 (0.45 to 1.18)	not calculable ²	VERY LOW	IMPORTANT

aOR: adjusted odds ratio; CI: confidence interval;

¹Quality of evidence downgraded by 2 due to high risk of bias for confounding, selection of participants, use of subjective measures for outcome data, and moderate risk for missing data bias.

²Not calculable as control group event rate unknown

³Quality of evidence downgraded by 2 due to high risk of bias for confounding, selection of participants, and use of subjective measures for outcome data.

⁴The quality of the evidence was downgraded by 1 due to serious imprecision as the 95% CI interval crosses the line of no effect

⁵Study downgraded by 1 as the breastfeeding time point does not fit the protocol criteria

Table 6: Clinical evidence profile for comparison shared sleep surface to no shared sleep surface – Observational studies (protocol deviation – exposure: breastfeeding, outcome: bed sharing)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Breastfeeding	No breastfeeding	Relative (95% CI)	Absolute		
Frequent bed sharing - Breastfeeding 4 weeks or less versus no breastfeeding - Black women												
1 (Broussard 2012)	observational studies	very serious ¹	no serious inconsistency	serious ²	no serious imprecision	none	307	474	aOR 4.02 (2.48)	not calculable ³	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Breastfeeding	No breastfeeding	Relative (95% CI)	Absolute		
									to 6.52)			
Frequent bed sharing – Breastfeeding 4 weeks or less versus no breastfeeding – White women												
1 (Broussard 2012)	observational studies	very serious ¹	no serious inconsistency	serious ²	serious ⁴	none	351	378	aOR 1.22 (0.77 to 1.93)	not calculable ³	VERY LOW	CRITICAL
Frequent bed sharing - Breastfeeding >4 weeks versus no breastfeeding - Black women												
1 (Bousard 2012)	observational studies	very serious ¹	no serious inconsistency	serious ²	no serious imprecision	none	563	474	aOR 5.84 (3.71 to 9.19)	not calculable ³	VERY LOW	CRITICAL
Frequent bed sharing – Breastfeeding >4 weeks versus no breastfeeding - White women												
1 (Broussard 2012)	observational studies	very serious ¹	no serious inconsistency	serious ²	no serious imprecision	none	718	378	aOR 2.65 (1.79 to 3.92)	not calculable ³	VERY LOW	CRITICAL
Regular bed share - Breastfeeding 1 to <8 weeks versus no breastfeeding or breastfeeding less than 1 week												
1 (Ball 2012)	observational studies	very serious ⁵	no serious inconsistency	serious ²	serious imprecision ⁴	none	NR	NR	aOR 1.15 (0.65 to 2.03)	not calculable ³	VERY LOW	CRITICAL
Regular bed sharing - Breastfeeding 8 weeks or more versus no breastfeeding												
1 (Ball 2012)	observational studies	very serious ⁵	no serious inconsistency	serious ²	no serious imprecision	none	NR	NR	aOR 3.06 (2	not calculable ³	VERY LOW	CRITICAL

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Breastfeeding	No breastfeeding	Relative (95% CI)	Absolute		
									to 4.68)			
Early only bed sharing - Breastfeeding at 2 months versus no breastfeeding												
1 (Luijk 2013)	Observational studies	very serious ¹	no serious inconsistency	serious ²	no serious imprecision	none	NR	NR	aOR 1.77 (1.42 to 2.21)	not calculable ³	VERY LOW	CRITICAL
Bed sharing – Breastfeeding at 3 months versus no breastfeeding												
1 (Mc Coy 2004)	observational studies	very serious ¹	no serious inconsistency	serious ²	no serious imprecision	none	102	87	aOR 3.40 (2.90 to 3.99)	not calculable ³	VERY LOW	CRITICAL
Bed sharing - Breastfeeding at 6 months versus no breastfeeding												
1 (Mc Coy 2004)	observational studies	very serious ¹	no serious inconsistency	serious ²	no serious imprecision	none	67	94	aOR 3.60 (3.00 to 4.32)	not calculable ³	VERY LOW	CRITICAL

aOR: adjusted odds ratio; CI: confidence interval; NR: not reported

¹ Quality of evidence downgraded by 2 due to high risk of bias for confounding, selection of participants, and use of subjective measures for outcome data.

² Study downgraded by 1 due to breastfeeding being the exposure and co-sleeping the outcome (opposite to protocol criteria).

³ Not calculable as control group event rate unknown

⁴ Quality of the evidence was downgraded by 1 due to serious imprecision as the 95% CI interval crosses the line of no effect

⁵ *Quality of evidence downgraded by 2 due to high risk of bias for confounding, selection of participants, use of subjective measures for outcome data, and moderate risk for missing data bias.*

Table 7: Clinical evidence profile – Comparison 1: Shared sleep surface to no shared sleep surface – Observational studies (protocol deviation – exposure: maternal depression, outcome: bed sharing)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Maternal depression	No maternal depression	Relative (95% CI)	Absolute		
Usual bed sharing - Women with higher depression scores versus women lower depression scores at 3 to 7 months												
1 (Brennar 2003)	observational studies	very serious ¹	no serious inconsistency	very serious ²	serious ³	none	NR	NR	aOR 1.27 (0.96 to 1.68)	not calculable ⁴	VERY LOW	IMPORTANT
Early only bed share - Maternal depression versus no maternal depression at 2 months												
1 (Luijk 2013)	observational studies	very serious ¹	no serious inconsistency	Serious ⁵	serious ³	none	NR	NR	aOR 1.19 (0.94 to 1.51)	not calculable ⁴	VERY LOW	IMPORTANT

aOR: adjusted odds ratio; CI: confidence interval; NC: not calculable as control group event rate unknown; NR: not reported

¹ *Quality of evidence downgraded by 2 due to high risk of bias for confounding, selection of participants, and use of subjective measures for outcome data.*

² *Study downgraded by 2 due to maternal depression being the exposure and co-sleeping the outcome (opposite to protocol criteria), and/or maternal depression time point does not fit protocol criteria (i.e. parental emotional health and wellbeing in the first 8 weeks after the birth).*

³ *Evidence downgraded by 1 due to serious imprecision, 95% confidence interval crosses one default MID for dichotomous outcomes (0.80, 1.25).*

⁴ *Not calculable as control group event rate unknown*

⁵ *Study downgraded by 1 due to maternal depression being the exposure and co-sleeping the outcome (opposite to protocol criteria)*

Table 8: Clinical evidence profile – Comparison 1: Shared sleep surface versus no shared sleep surface – Observational studies (protocol deviation – exposure: parent-associated stress, outcome: bed sharing)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Parent-associated stress	No parent-associated stress	Relative (95% CI)	Absolute		
Frequent infant bed sharing - Partner-associated stress versus no parent-associated stress (undefined time point)												
1 (Broussard 2012)	observational studies	very serious ¹	no serious inconsistency	very serious ²	no serious imprecision	none	NR	NR	aOR 1.56 (1.22 to 1.99)	not calculable ³	VERY LOW	IMPORTANT

aOR: adjusted odds ratio; CI: confidence interval; NC: not calculable as control group event rate unknown; NR: not reported.

¹ Quality of evidence downgraded by 2 due to high risk of bias for confounding, selection of participants, and use of subjective measures for outcome data.

² Study downgraded by 2 due to partner-associated stress being the exposure and co-sleeping the outcome (opposite to protocol criteria), and unclear whether time point for partner-associated stress meets protocol criteria (i.e. parental emotional health and wellbeing in the first 8 weeks after the birth).

³ Not calculable as control group event rate unknown.

Table 9: Clinical evidence profile – Comparison 2: Shared sleep surface versus another shared sleep surface - RCTs

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Mother's bed	Side-car crib	Relative (95% CI)	Absolute (95% CI)		
Serious illness in the baby - adverse events (not defined)												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Mother's bed	Side-car crib	Relative (95% CI)	Absolute (95% CI)		
1 (Ball 2006)	randomised trials	serious ¹	no serious inconsistency	serious ²	very serious imprecision ³	none	0/18 (0.0%)	0/23 (0.0%)	RD 0.00 (-0.09 to 0.09)	0 fewer per 1,000 (from 90 fewer to 90 more)	VERY LOW	IMPORTANT
Parental satisfaction - maternal satisfaction, scale not reported higher scores indicate higher satisfaction												
1 (Ball 2006)	randomised trials	serious ¹	no serious inconsistency	serious ²	very serious ⁴	none	18	23	-	MD 0.1 lower (0.73 lower to 0.53 higher)	VERY LOW	IMPORTANT

CI: Confidence interval; OR: Odds ratio; MD: Mean difference; RD: Risk Difference

¹ Quality of evidence downgraded by 1 due to lack of blinding for participants and investigators which could have affected the subjective outcome assessments and concerns regarding selection bias due to incomplete outcome reporting (Ball 2006).

² Quality of evidence downgraded by 1 due to indirectness in the study population - unknown whether co-sleeping with the baby on a shared sleep surface took place within the first 8 weeks after birth.

³ The quality of the evidence was downgraded by 2 due to very serious imprecision as the 95% CI interval crosses the line of no effect and there are less than 300 events in each group.

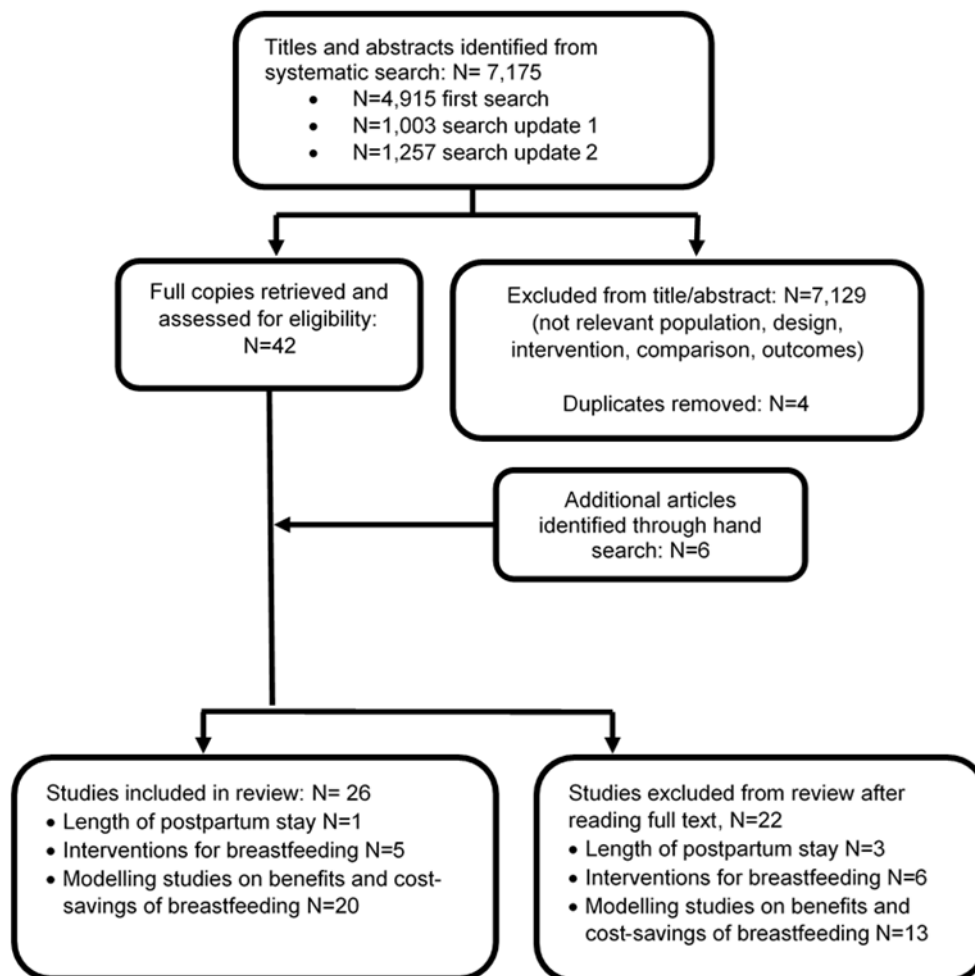
⁴ Quality of evidence downgraded by 2 because 95% CI crosses 2 default MIDs (-0.5 SD control, +0.5 SD control)

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: What are the benefits and harms of co-sleeping?

A global health economics search was undertaken for all areas covered in the guideline. Figure 2 shows the flow diagram of the selection process for economic evaluations of postnatal care interventions, including modelling studies on the benefits and cost-savings of breastfeeding.

Figure 2. Flow diagram of selection process for economic evaluations of postnatal care interventions and modelling studies on the benefits and cost-savings of breastfeeding



Appendix H – Economic evidence tables

Economic evidence tables for the review question: What are the benefits and harms of co-sleeping?

No economic evidence was identified which was applicable to this review question.

Appendix I – Economic evidence profiles

Economic evidence profiles for the review question: What are the benefits and harms of co-sleeping?

No economic evidence was identified which was applicable to this review question.

Appendix J – Economic analysis

Economic analysis for the review question: What are the benefits and harms of co-sleeping?

No economic analysis was conducted for this review question.

Appendix K – Excluded studies

Excluded studies for review question: What are the benefits and harms of co-sleeping?

Clinical studies

Table 9: Excluded studies and reasons for their exclusions

Study	Reason for exclusion
Adler, M. R., Hyderi, A., Hamilton, A., What are safe sleeping arrangements for infants?, <i>Journal of Family Practice</i> , 55, 1083-1084+1087, 2006	Systematic review - studies assessed individually.
Ahlers-Schmidt, C. R., Schunn, C., Nguyen, M., Nimeskern-Miller, J., Ilahe, R., Kuhlmann, S., Does providing infant caregivers with a wearable blanket increase safe sleep practices? A randomized controlled trial, <i>Clinical Pediatrics</i> , 55, 79-82, 2016	Intervention not relevant - safe sleep message.
Alexander, R. T., Radisch, D., Sudden infant death syndrome risk factors with regards to sleep position, sleep surface, and co-sleeping, <i>Journal of Forensic Sciences</i> , 50, 147-151, 2005	Retrospective study, prospective data available.
Alm, B., Mollborg, P., Erdes, L., Pettersson, R., Aberg, N., Norvenius, G., Wennergren, G., SIDS risk factors and factors associated with prone sleeping in Sweden, <i>Archives of Disease in Childhood</i> , 91, 915-917, 2006	Study outcomes not relevant - compares .epidemiological factor (sleeps in parents' bed at night) among healthy Swedish infants (control infants of the Nordic sudden infant death syndrome, mean age 19 weeks) and infants of Western Sweden, age 6 months.
Baddock, S. A., Galland, B. C., Beckers, M. G. S., Taylor, B. J., Bolton, D. P. G., Bed-sharing and the infant's thermal environment in the home setting, <i>Archives of Disease in Childhood</i> , 89, 1111-1116, 2004	Study design and outcomes not relevant - sample size <50 mother-infant pairs in each arm; infant temperature.
Baddock, S. A., Galland, B. C., Bolton, D. P. G., Williams, S. M., Taylor, B. J., Differences in infant and parent behaviors during routine bed sharing compared with cot sleeping in the home setting, <i>Pediatrics</i> , 117, 1599-1607, 2006	Study design not relevant - sample size <50 mother-infant pairs in each arm.
Baddock, S. A., Galland, B. C., Bolton, D. P. G., Williams, S. M., Taylor, B. J., Hypoxic and hypercapnic events in young infants during bed-sharing, <i>Pediatrics</i> , 130, 237-244, 2012	Study design and outcomes not relevant - sample size <50 mother-infant pairs in each arm; infant desaturation events.
Baddock, S. A., Purnell, M. T., Blair, P. S., Pease, A., Elder, D., Galland, B. C., The influence of bed-sharing on infant physiology, breastfeeding and behaviour: A systematic review, <i>Sleep Medicine Reviews</i> , 43, 106-117, 2019	Systematic review - studies assessed individually.

Study	Reason for exclusion
Baddock, S. A., Tipene-Leach, D., Williams, S. M., Tangiora, A., Jones, R., Iosua, E., MacLeod, E. C., Taylor, B. J., Wahakura versus bassinet for safe infant sleep: A randomized trial, <i>Pediatrics</i> , 139 (2) (no pagination), 2017	No data available for interventions of interest; not possible to determine which proportion of intervention shared sleep surface with mother No data available for interventions of interest; not possible to determine which proportion of intervention shared sleep surface with mother.
Baddock, S. A., Tipene-Leach, D., Williams, S. M., Tangiora, A., Jones, R., Macznik, A. K., Taylor, B. J., Physiological stability in an indigenous sleep device: a randomised controlled trial, <i>Archives of Disease in Childhood</i> , 103, 377-382, 2018	No relevant outcomes.
Ball, H. L., Breastfeeding, bed-sharing, and infant sleep, <i>Birth</i> , 30, 181-8, 2003	Study not relevant - only unadjusted data presented.
Ball, H. L., Blair, P. S., Ward-Platt, M. P., "New" practice of bed sharing and risk of SIDS, <i>Lancet</i> , 363, 1558, 2004	Commentary.
Ball, H. L., Moya, E., Fairley, L., Westman, J., Oddie, S., Wright, J., Infant care practices related to sudden infant death syndrome in South Asian and White British families in the UK, <i>Paediatric and Perinatal Epidemiology</i> , 26, 3-12, 2012	Study outcomes not relevant - no relevant outcomes reported between sleep surface sharing infants and no sleep surface sharing infants.
Bartick, M., Bed sharing with unimpaired parents is not an important risk for sudden infant death syndrome [13], <i>Pediatrics</i> , 117, 992-993, 2006	Editorial.
Blair, P. S., Ball, H. L., The prevalence and characteristics associated with parent-infant bed-sharing in England, <i>Archives of Disease in Childhood</i> , 89, 1106-1110, 2004	Study design not relevant - case-control study, RCT evidence available.
Bovbjerg, M. L., Hill, J. A., Uphoff, A. E., Rosenberg, K. D., Women Who Bedshare More Frequently at 14 Weeks Postpartum Subsequently Report Longer Durations of Breastfeeding, <i>Journal of Midwifery and Women's Health</i> , 63, 418-424, 2018	Study outcomes not relevant - no useable data comparing bed-sharing and no bed sharing infants for proportion of women breastfeeding.
Carlin, R. F., Moon, R. Y., Risk factors, protective factors, and current recommendations to reduce sudden infant death syndrome a review, <i>JAMA Pediatrics</i> , 171, 175-180, 2017	Systematic review - studies assessed individually.
Carpenter, R., McGarvey, C., Mitchell, E. A., Tappin, D. M., Vennemann, M. M., Smuk, M., Carpenter, J. R., 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> , 3 (5) (no pagination), 2013	Systematic review - studies assessed individually.

Study	Reason for exclusion
Carter, N., Rutty, G. N., Babies sleeping with parents and sudden infant death syndrome. Invoking sudden infant death syndrome in cosleeping may be misleading, <i>BMJ (Clinical research ed.)</i> , 321, 1019; author reply 1020, 2000	Letters to the editor.
Chiu, K., Tonkin, S. L., Gunn, A. J., McIntosh, C. C., Are baby hammocks safe for sleeping babies? A randomised controlled trial, <i>Acta Paediatrica</i> , 103, 783-787, 2014	Interventions not relevant - no bed sharing.
Chung, S. C., Chu, S. M., Huang, Y. S., Chen, P. L., Effect of co-sleeping and caregiver factors on infant sleep and physical stress reactivity, <i>Journal of Sleep Research</i> , 25 (Supplement 1), 229, 2016	Abstract.
Collins-Praino, L. E., Byard, R. W., Infants who die in shared sleeping situations differ from those who die while sleeping alone, <i>Acta Paediatrica, International Journal of Paediatrics</i> , 108, 611-614, 2019	Narrative review.
Colvin, J. D., Collie-Akers, V., Schunn, C., Moon, R. Y., Sleep environment risks for younger and older infants, <i>Pediatrics</i> , 134, e406-e412, 2014	Study design not relevant - case-control study, RCT evidence available.
Cunningham, H. M., Vally, H., Bugeja, L., Bed-Sharing in the First 8 Weeks of Life: An Australian Study, <i>Maternal and Child Health Journal</i> , 22, 556-564, 2018	Study design not relevant - case-control study, RCT evidence available.
Flick, L., White, D. K., Vemulapalli, C., Stulac, B. B., Kemp, J. S., Sleep position and the use of soft bedding during bed sharing among African American infants at increased risk for sudden infant death syndrome, <i>Journal of Pediatrics</i> , 138, 338-343, 2001	Study not relevant - only unadjusted data presented.
Galler, J. R., Harrison, R. H., Ramsey, F., Bed-sharing, breastfeeding and maternal moods in Barbados, <i>Infant Behavior and Development</i> , 29, 526-534, 2006	Study outcomes not relevant.
Geib, L. T. C., Nunes, M. L., The incidence of sudden death syndrome in a cohort of infants, <i>Jornal de Pediatria</i> , 82, 21-26, 2006	Low-/middle-income country – Brazil.
Gunn, T. R., Davis, S., Tonkin, S., Bed sharing as a risk factor for sudden infant death (cot death), <i>The New Zealand medical journal</i> , 105, 155-156, 1992	Letter to the editor.

Study	Reason for exclusion
Horsley, T., Clifford, T., Barrowman, N., Bennett, S., Yazdi, F., Sampson, M., Moher, D., Dingwall, O., Schachter, H., Cote, A., Benefits and harms associated with the practice of bed sharing a systematic review, <i>Archives of Pediatrics and Adolescent Medicine</i> , 161, 237-245, 2007	Systematic review - studies assessed individually.
Huang, Y., Hauck, F. R., Signore, C., Yu, A., Raju, T. N. K., Huang, T. T. K., Fein, S. B., Influence of bed sharing activity on breastfeeding duration among US mothers, <i>JAMA Pediatrics</i> , 167, 1038-1044, 2013	Study population unclear - the study included infants with a gestational age at birth of 35 weeks (no further details reported).
Hughes, A., Gallagher, S., Hannigan, A., A Cluster Analysis of Reported Sleeping Patterns of 9-Month Old Infants and the Association with Maternal Health: Results from a Population Based Cohort Study, <i>Maternal and Child Health Journal</i> , 19, 1881-1889, 2015	Study intervention not relevant - no comparison between co-sleeping and no co-sleeping babies.
Hussain, S., Lowell, G. S., Roehler, D. R., Quinlan, K. P., Tandon, S. D., Schwartz, L., You can have your breastmilk and safe sleep too: a preliminary analysis of infant safe sleep data in a Midwestern home visiting program, <i>Injury Epidemiology</i> , 5, 3-9, 2018	Study not relevant - only unadjusted data presented.
Kadakia, A., Joyner, B., Tender, J., Oden, R., Moon, R. Y., Breastfeeding in African Americans may not depend on sleep arrangement: a mixed-methods study, <i>Clinical Pediatrics</i> , 54, 47-53, 2015	Study design not relevant - cross-sectional study.
Kassa, H., Moon, R. Y., Colvin, J. D., Risk factors for sleep-related infant deaths in in-home and out-of-home settings, <i>Pediatrics</i> , 138 (5) (no pagination), 2016	Study design not relevant - case-control study, RCT evidence available.
Knight, L. D., Hunsaker, D. M., Corey, T. S., Cosleeping and sudden unexpected infant deaths in Kentucky: A 10-year retrospective case review, <i>American Journal of Forensic Medicine and Pathology</i> , 26, 28-32, 2005	Study design not relevant - case-control study, RCT evidence available.
Lahr, M. B., Rosenberg, K. D., Lapidus, J. A., Maternal-infant bed sharing: risk factors for bed sharing in a population-based survey of new mothers and implications for SIDS risk reduction, <i>Maternal & Child Health Journal</i> <i>Matern Child Health J</i> , 11, 277-86, 2007	Study design not relevant - case-control study, RCT evidence available.
Lawrence, R. A., Co-sleeping and breastfeeding: is it safe?, <i>Breastfeeding Medicine: The Official Journal of the Academy of Breastfeeding Medicine</i> , 3, 1, 2008	Editorial.

Study	Reason for exclusion
Li, L., Zhang, Y., Zielke, R. H., Ping, Y., Fowler, D. R., Observations on increased accidental asphyxia deaths in infancy while cosleeping in the state of Maryland, <i>The American journal of forensic medicine and pathology : official publication of the National Association of Medical Examiners</i> , 30, 318-321, 2009	Study design not relevant - case-control study, RCT evidence available.
Lozoff, B., Askew, G. L., Wolf, A. W., Cosleeping and early childhood sleep problems: effects of ethnicity and socioeconomic status, <i>Journal of developmental and behavioral pediatrics : JDBP</i> , 17, 9-15, 1996	Study not relevant - no relevant outcomes.
Mao, A., Burnham, M. M., Goodlin-Jones, B. L., Gaylor, E. E., Anders, T. F., A comparison of the sleep-wake patterns of cosleeping and solitary-sleeping infants, <i>Child Psychiatry and Human Development</i> , 35, 95-105, 2004	Study design not relevant - <50 mother-infant pairs in each arm (n=18).
McKenna, J. J., McDade, T., Why babies should never sleep alone: a review of the co-sleeping controversy in relation to SIDS, bed sharing and breast feeding, <i>Paediatric Respiratory Reviews</i> , 6, 134-52, 2005	Narrative review.
McKenna, J. J., Mosko, S. S., Richard, C. A., Bedsharing promotes breastfeeding, <i>Pediatrics</i> , 100, 214-219, 1997	Study design not relevant - <50 infants (n=35 mother-infant pairs).
Mindell, J. A., Leichman, E. S., Walters, R. M., Sleep location and parent-perceived sleep outcomes in older infants, <i>Sleep Medicine</i> , 39, 1-7, 2017	Study outcomes not relevant - only unadjusted data presented.
Mitchell, E. A., Esmail, A., Jones, D. R., Clements, M., 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>The New Zealand medical journal</i> , 109, 352-355, 1996	Study design not relevant - case-control; RCT evidence available.
Mitchell, E. A., Scragg, R., Are infants sharing a bed with another person at increased risk of sudden infant death syndrome?, <i>Sleep</i> , 16, 387-389, 1993	Study design not relevant - case-control study, RCT evidence available.
Mitchell, E. A., Tuohy, P. G., Brunt, J. M., Thompson, J. M. D., Clements, M. S., Stewart, A. W., Ford, R. P. K., Taylor, B. J., Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: A prospective study, <i>Pediatrics</i> , 100, 835-840, 1997	Study design not relevant - case-control study, RCT evidence available.

Study	Reason for exclusion
Mollborg, P., Wennergren, G., Almqvist, P., Alm, B., Bed sharing is more common in sudden infant death syndrome than in explained sudden unexpected deaths in infancy, <i>Acta Paediatrica, International Journal of Paediatrics</i> , 104, 777-783, 2015	Study design not relevant - case-control study, RCT evidence available.
Mollborg, P., Wennergren, G., Norvenius, S. G., Alm, B., Bed-sharing among six-month-old infants in western Sweden, <i>Acta Paediatrica, International Journal of Paediatrics</i> , 100, 226-230, 2011	Study design not relevant - case-control study, RCT evidence available.
Ngale, K. M., Santos, I. S., Gonzalez-Chica, D. A., de Barros, A. J., Matijasevich, A., Bed-sharing and risk of hospitalisation due to pneumonia and diarrhoea in infancy: the 2004 Pelotas Birth Cohort, <i>Journal of Epidemiology & Community Health</i> , 67, 245-9, 2013	Low-/middle-income country – Brazil.
Norton, P. J., Grellner, K. W., A Retrospective Study on Infant Bed-Sharing in a Clinical Practice Population, <i>Maternal and Child Health Journal</i> , 1-7, 2010	Retrospective study, prospective data available.
Okami, P., Weisner, T., Olsmted, R., Outcome correlates of parent-child bed sharing: An eighteen-year longitudinal study, <i>Journal of Developmental and Behavioral Pediatrics</i> , 23, 244-253, 2002	Timeframe of outcomes outside scope of protocol - earliest reported outcomes at 6 years.
Ostfeld, B. M., Esposito, L., Perl, H., Hegyi, T., Concurrent risks in sudden infant death syndrome, <i>Pediatrics</i> , 125, 447-453, 2010	Study design not relevant - case-control study, RCT evidence available.
Pollard, K., Fleming, P., Young, J., Sawczenko, A., Blair, P., Night-time non-nutritive sucking in infants aged 1 to 5 months: Relationship with infant state, breastfeeding, and bed-sharing versus room-sharing, <i>Early Human Development</i> , 56, 185-204, 1999	Outcome not relevant - non-nutritive sucking.
Reyes, J. A., Somers, G. R., Chiasson, D. A., Sudden Unexpected Death in Neonates: A Clinico-pathological Study, <i>Pediatric and Developmental Pathology</i> , 2018	Study design not relevant - case-control study, RCT evidence available.
Richard, C. A., Mosko, S. S., Mother-infant bed sharing is associated with an increase in infant heart rate, <i>Sleep</i> , 27, 507-511, 2004	Study design not relevant - <50 mother-infant pairs in each arm; no relevant outcomes.
Ruys, J. H., De Jonge, G. A., Brand, R., Engelberts, A. C., Semmekrot, B. A., Bed-sharing in the first four months of life: A risk factor for sudden infant death, <i>Acta Paediatrica, International Journal of Paediatrics</i> , 96, 1399-1403, 2007	Study design not relevant - case-control study, RCT evidence available.

Study	Reason for exclusion
Santos, I. S., Mota, D. M., Matijasevich, A., Barros, A. J. D., Barros, F. C. F., Bed-Sharing at 3 Months and Breast-Feeding at 1 Year in Southern Brazil, <i>Journal of Pediatrics</i> , 155, 505-509, 2009	Low-/middle-income country – Brazil.
Sauber-Schatz, E. K., Sappenfield, W. M., Shapiro-Mendoza, C. K., Comprehensive review of sleep-related sudden unexpected infant deaths and their investigations: Florida 2008, <i>Maternal and Child Health Journal</i> , 19, 381-390, 2015	Study design not relevant - case-control study, RCT evidence available.
Senter, L., Sackoff, J., Landi, K., Boyd, L., Studying Sudden and Unexpected Infant Deaths in a Time of Changing Death Certification and Investigation Practices: Evaluating Sleep-Related Risk Factors for Infant Death in New York City, <i>Maternal and Child Health Journal</i> , 1-7, 2010	Study design not relevant - case-control study, RCT evidence available.
Shields, L. B. E., Hunsaker, D. M., Muldoon, S., Corey, T. S., Spivack, B. S., Risk factors associated with sudden unexplained infant death: A prospective study of infant care practices in Kentucky, <i>Pediatrics</i> , 116, e13-e20, 2005	Study not relevant - no relevant outcomes.
Somers, R. L., Deaths and near deaths of healthy newborn infants while bed sharing on maternity wards, <i>Journal of Perinatology</i> , 34, 957-958, 2014	Letter to the editor.
Taylor, N., Donovan, W., Leavitt, L., Consistency in infant sleeping arrangements and mother-infant interaction, <i>Infant Mental Health Journal</i> , 29, 77-94, 2008	Study design not relevant - <50 mother-infant pairs in each arm.
Thach, B. T., Deaths and near deaths of healthy newborn infants while bed sharing on maternity wards, <i>Journal of Perinatology</i> , 34, 275-9, 2014	Study design not relevant - case-control study, RCT evidence available.
Thogmartin, J. R., Siebert Jr, C. F., Pellan, W. A., Sleep position and bed-sharing in sudden infant deaths: An examination of autopsy findings, <i>Journal of Pediatrics</i> , 138, 212-217, 2001	Retrospective study, prospective data available.
Thompson, E. L., Moon, R. Y., Hazard Patterns Associated with Co-sleepers, <i>Clinical Pediatrics</i> , 55, 645-649, 2016	Retrospective study, prospective data available.
Tipene-Leach, D., Baddock, S. A., Williams, S. M., Tangiora, A., Jones, R., McElnay, C., Taylor, B. J., The Pepi-Pod study: Overnight video, oximetry and thermal environment while using an in-bed sleep device for sudden unexpected death in infancy prevention, <i>Journal of Paediatrics & Child HealthJ Paediatr Child Health</i> , 22, 22, 2018	Study design not relevant - <50 mother-infant pairs in one intervention arm.
Trachtenberg, F. L., Haas, E. A., Kinney, H. C., Stanley, C., Krous, H. F., Risk factor changes for sudden infant death syndrome after initiation of	Study design not relevant - case-control study, RCT evidence available.

Study	Reason for exclusion
back-to-sleep campaign, <i>Pediatrics</i> , 129, 630-638, 2012	
Tully, K. P., Ball, H. L., Postnatal unit bassinet types when rooming-in after cesarean birth: implications for breastfeeding and infant safety, <i>Journal of human lactation : official journal of International Lactation Consultant Association</i> , 28, 495-505, 2012	Outcome not relevant - breastfeeding measured at 2 days postpartum.
Vemulapalli, C., Grady, K., Kemp, J. S., Use of Safe Cribs and Bedroom Size among African American Infants with a High Rate of Bed Sharing, <i>Archives of Pediatrics and Adolescent Medicine</i> , 158, 286-289, 2004	Study not relevant - no relevant outcomes, <50 mother-infant pairs in one intervention arm.
Vennemann, M. M., Hense, H. W., Bajanowski, T., Blair, P. S., Complojer, C., Moon, R. Y., Kiechl-Kohlendorfer, U., Bed sharing and the risk of sudden infant death syndrome: Can we resolve the debate?, <i>Journal of Pediatrics</i> , 160, 44-48.e2, 2012	Systematic review - studies assessed individually.
Volkovich, E., Ben-Zion, H., Karny, D., Meiri, G., Tikotzky, L., Sleep patterns of co-sleeping and solitary sleeping infants and mothers: A longitudinal study, <i>Sleep Medicine</i> , 16, 1305-1312, 2015	Not comparative.
Wailoo, M., Ball, H., Fleming, P., Platt, M. W., Infants bed-sharing with mothers, <i>Archives of Disease in Childhood</i> , 89, 1082-1083, 2004	Editorial.
Weber, M. A., Risdon, R. A., Ashworth, M. T., Malone, M., Sebire, N. J., Autopsy findings of co-sleeping-associated sudden unexpected deaths in infancy: Relationship between pathological features and asphyxial mode of death, <i>Journal of Paediatrics and Child Health</i> , 48, 335-341, 2012	Retrospective study, prospective data available.
Wolke, D., Sohne, B., Riegel, K., Ohrt, B., Osterlund, K., An epidemiologic longitudinal study of sleeping problems and feeding experience of preterm and term children in southern Finland: comparison with a southern German population sample, <i>Journal of Pediatrics</i> , 133, 224-31, 1998	Study not relevant - population not relevant (babies admitted to special care unit as infants, large proportion preterm); no relevant outcomes.
Young, J., Sawczenko, A., Fleming, P. J., Observations of night-time behaviour between low SIDS risk infants and their mothers: a longitudinal comparison of room sharing and bed sharing, <i>Early Human Development</i> , 50, 224-225, 1998	Abstract.

Study	Reason for exclusion
Zachritz, W., Fulmer, M., Chaney, N., An Evidence-Based Infant Safe Sleep Program to Reduce Sudden Unexplained Infant Deaths, The American journal of nursing, 116, 48-55, 2016	Not comparative.

Economic studies

No economic evidence was identified for this review.

Appendix L – Research recommendations

Research recommendations for review question: What are the benefits and harms of co-sleeping?

No research recommendations were made for this review question.