

<b>Section A</b>		
<b>Institution:</b> Durham University		
<b>Unit of Assessment:</b> UoA: 22, Anthropology & Development		
<b>Title of case study:</b> Mother-infant proximity in the postnatal period		
<b>Period when the underpinning research was undertaken:</b> 2002 - 2016		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b> Professor Helen Ball	<b>Role(s) (e.g. job title):</b> Professor of Anthropology	<b>Period(s) employed by submitting HEI:</b> September 1993 to present
<b>Period when the claimed impact occurred:</b> August 2013 to present		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<b>Section B</b>		
<b>1. Summary of the impact</b>		
<p>We demonstrated the benefits of using side-car cribs in postpartum settings and the close link between increased breastfeeding frequency and mother-baby night-time contact via three randomised trials of night-time care on a United Kingdom postnatal ward. Our findings led to changes in recommended best practice in postnatal care in the United Kingdom and overseas. We showed that the use of stand-alone bassinets to accommodate babies in mothers' room impeded interaction between mothers and babies at night, leading to poorer breastfeeding initiation, unsafe handling, and low maternal confidence. Consequently, United Kingdom hospitals began using 3-sided cribs with an open side adjacent to the mother's bed on postnatal wards. United Kingdom and international organisations have also used our findings from the trials to develop new policies for staff and guidance for parents emphasising the importance of mother-baby night-time contact for breastfeeding initiation and continuation. In the United Kingdom our work affects the postnatal care of 630,000 mothers and babies annually.</p>		
<b>2. Underpinning research</b>		
<p>Since 2002 the Durham University Anthropology Department's Infancy &amp; Sleep Centre (formerly the Parent-Infant Sleep Lab) team has researched the implications of mother-infant proximity during postnatal hospitalisation on breastfeeding and infant safety outcomes using a commercial bassinet known as a 'clip-on' or a 'side-car' crib [R1-R5]. This 3-sided bassinet with an open side is positioned adjacent to the mother's bed and secured in place to provide a continuous infant sleep-surface with no barrier between mother and baby.</p>		
<p>With the support of a Consultant Neonatologist overseeing the postnatal ward we conducted a series of three randomised controlled trials (RCT), with qualitative follow-up, at a tertiary-level hospital in Newcastle-upon-Tyne, United Kingdom [R1, R3, R4]. We pioneered the use of night-time video-recording on the postnatal ward to undertake these trials. Our first RCT [R1] examined the breastfeeding initiation, sleep and safety outcomes for mothers and babies randomly allocated to use a standard bassinette, a side-car crib, or to have the baby in the mother's bed, following normal delivery with no opiate analgesia. Our second RCT [R4], undertaken by Dr Kristin Tully for her PhD, examined breastfeeding initiation and infant safety outcomes for mothers and babies randomly allocated to use a standard bassinette or side-car crib following scheduled c-section delivery. Our third RCT [R3] also examined breastfeeding duration and infant sleep location at home for mothers and babies randomly allocated to use a standard bassinette or side-car crib following birth of any kind.</p>		
<p>At the time this research began, mother-baby rooming-in was becoming standard practice in United Kingdom maternity units, encouraged by the United Nations Children's Fund (UNICEF) UK Baby-friendly Initiative since 1995. This research found that the use of stand-alone bassinets for mother-baby rooming-in did not adequately facilitate mother-baby contact, responsive care, or breastfeeding initiation [R1, R2] as these bassinets are designed for optimal use by staff (in newborn nurseries) rather than by mothers at the bedside. Furthermore, following caesarean delivery mothers found stand-alone bassinets to be</p>		

a hindrance, not just a limitation, leading to unsafe infant handling and sleeping practices, with babies left to sleep on pillows on mothers' laps due to the difficulty women experienced in returning babies to the bassinets [R4].

Our research demonstrated that the use of side-car cribs facilitated mother-baby interaction, improved breastfeeding initiation, improved safe infant handling post-caesarean delivery, and enhanced maternal experiences of the postnatal ward stay for first time mothers, and women experiencing operative or assisted delivery [R1-R5]. Although the use of side-car cribs did not extend to improved breastfeeding duration [R3], the data from our third trial found that bed-sharing at home in the first 13 postnatal weeks was strongly correlated with continued breastfeeding to 6 months of age (the United Kingdom recommended minimum period for exclusive breastfeeding), particularly for women with a strong motivation to breastfeed [R6]. This is important for supporting women to continue breastfeeding in the first few postpartum months.

These trials attracted 5 external research grants and outputs include 12 journal articles and 6 book chapters that are represented below by the six indicative publications R1-R6.

We disseminate the outputs of our research directly to health practitioners and parents via the Baby Sleep Information Source website (Basis, formerly the Infant Sleep Info Source (ISIS) 2012-2018), translating them into formats that are more easily accessible than academic journals. In some cases, practice recommendations and policy documents link to or cite material relating to our research from Basis rather than citing our publications directly. This is indicated in impact descriptions.

### 3. References to the research (maximum of six references)

**R1.** Helen L Ball, Martin P Ward-Platt, Emma Heslop, Stephen J Leech, Kath A Brown: Randomised trial of infant sleep location on the postnatal ward. *Archives of Disease in Childhood* 2006; 91(12):1005-10. DOI:10.1136/adc.2006.099416

47 international citations (Web of Science 8.11.20); designated a Top Hot Read by International Society for Social Pediatrics & Child Health.

**R2.** Helen L Ball Evolutionary Paediatrics A Case Study in Applying Darwinian Medicine. *Medicine and Evolution: Current Applications, Future Prospects.*, Edited by Sarah Elton, Paul O'Higgins, 2008; Taylor & Francis., ISBN: 9781420051346

7 international citations (Web of Science 8.11.20). Included in REF2014, internally ranked as 4\*

**R3.** Helen L Ball, Martin P Ward-Platt, Denise Howel, Charlotte Russell: Randomised trial of sidecar crib use on breastfeeding duration (NECOT). *Archives of Disease in Childhood* 2011; 96(7):630-4. DOI:10.1136/adc.2010.205344

16 international citations (Web of Science 8.11.20). Recommended in F1000 prime. Included in REF2014, internally ranked 3\*

**R4.** Kristin P Tully, Helen L Ball: Postnatal Unit Bassinet Types When Rooming-In after Cesarean Birth: Implications for Breastfeeding and Infant Safety. *Journal of Human Lactation* 2012; 28(4):495-505. DOI:10.1177/0890334412452932

20 international citations (Web of Science 8.11.20).

**R5.** Denise Howel, Helen L Ball: Association between Length of Exclusive Breastfeeding and Subsequent Breastfeeding Continuation. *Journal of Human Lactation* 2013; 29(4). DOI:10.1177/0890334413492908

19 international citations (Web of Science 8.11.20).

**R6.** Helen L Ball, Denise Howel, Andy Bryant, Elspeth Best, Charlotte Russell, Martin Ward-Platt: Bed-sharing by breastfeeding mothers: who bed-shares and what is the relationship with breastfeeding duration? *Acta Paediatrica* 2016; DOI:10.1111/apa.13354

32 international citations (Web of Science 8.11.20).

### 4. Details of the impact

The impact of the above work is seen in the United Kingdom and beyond in policies for staff and guidance for parents issued by hospitals and/or National Health Service (NHS) Trusts,

breastfeeding support organisations, and organisations charged with ensuring mothers and infants are kept safe, provided with the best chance of initiating and establishing breastfeeding, and not separated unnecessarily during hospital postpartum care. This work has underpinned practice, policy, and guidelines issued prior to and during the Research Excellence Framework (REF) assessment period. We emphasise here the impact evidence being used from August 2013 to the present date.

This research is widely used as evidence that proximate sleep arrangements support breastfeeding initiation and continuation, appearing in multiple infant feeding policies and guidance recommending that mothers and babies should remain together day and night in the early postnatal period [E1]. A unique impact of our research is that side-car cribs are recommended in United Kingdom and European hospitals for use post-caesarean delivery [E2] and are cited as good practice for facilitating mother baby contact following all delivery types [E3]. Our work is also used as evidence of aspirational practice in settings (e.g. United States of America) where mother-infant separation following birth is currently the norm [E3]. Below we summarise key areas of impact from our work around the world.

Our research on mother-baby proximity has been used extensively by **Unicef UK Baby Friendly Initiative (BFI) to underpin their standards and recommendations.** The *Evidence and Rationale for the Unicef UK Baby Friendly Initiative (BFI) Standards* [E1a] sets out the evidence for each of the UNICEF/World Health Organisation (WHO) 10 steps for Baby Friendly accreditation as implemented in the United Kingdom. Our research is used to underpin BFI standards [E1a] on 'Parents' experiences of maternity services' particularly using the Baby Friendly Standards '3.2 Support all mothers and babies to initiate a close relationship and feeding soon after birth; 3.3 Enable mothers to get breastfeeding off to a good start; and 3.5 Support parents to have a close and loving relationship with their baby', which cite research outputs **R1 & R3, 6 other publications** by our team, and the **Baby Sleep Info Source website** (Basis – formerly known as Infant Sleep Information Source (ISIS)) where we summarise the outcomes of this research. In the United Kingdom 91% of maternity services and 89% of health visiting services have obtained or are seeking Baby Friendly accreditation. Around 700,000 babies are born in the United Kingdom each year, so our postnatal research annually affects the care of 630,000 babies and their mothers in the United Kingdom.

In addition to the formal BFI Standards [E1a] against which hospitals are assessed, Unicef UK also disseminate best practice guidance on postnatal care for the use of hospital managers, staff trainers, midwives, infant feeding co-ordinators, health visitors, children's centre workers, neonatologists and General Practitioners (GPs). Our postnatal care research is cited and shared extensively throughout these materials via the BFI website [E1b], BFI newsletters and resources such as *Caring for your baby at night* [E1c] and *Cosleeping and SIDS* [E1d]. In sum, these resources cite **R1, R3, R6**, at least 11 of our other publications from 2000 to 2020, and make multiple references to the Baby Sleep Info Source website. Via Unicef BFI our work reaches 92% of maternity services staff, 91% of health visiting staff, 75% of university midwifery trainees and 24% of university health visiting trainees in the United Kingdom, and a growing cohort of children's centres and neonatal units.

Multiple organisations produce breastfeeding, bedding-in & postnatal care policies, for instance **United Kingdom NHS Trusts** produce policies to guide the practice of staff on complex issues, when changes are implemented, or where practice is variable. These are often shared via hospital intranets, but some trusts make policy documents available on their websites. We know our research is used by many NHS trusts in policies for mother-baby care on the postnatal ward as we are asked to review these policies, to give presentations at hospitals where policies are under review, and to supply copies of our publications for inclusion in policy documents. Due to space limitations the evidence below is indicative of current NHS policies. **E2a:** Basildon & Thurrock, Mid-Essex, Southend NHS Trusts *Policy on Management of Bed-sharing for Mothers and Babies* cites **R6**, the use of side-car cribs on postnatal wards, plus other research from our team. **E2b:** NHS Highland's *Guidance on*

*Babies sharing their mother's bed while in hospital* (undated, downloaded 8.4.19) discusses the use of side-car cribs and cites **R1**. **E2c**: Salisbury NHS Foundation Trust *Guidance on Mothers & Infants Bed-sharing* scheduled for review 26 June 2020 cites **R1**, 4 other publications by our team and Basis (formerly ISIS). We are also told our research is cited in hospital policies in Belgium, Netherlands, and Norway. **E2d**: illustrates use of our work [**R1**] in a **Spanish NHS guideline**: *Clinical practice guideline for care in pregnancy and puerperium*, and in **E2e** the **World Health Organization (WHO)** uses **R1** in their *Guideline on Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services*.

The **American Academy of Pediatrics (AAP)** Clinical Report 'Safe Sleep and Skin-to-Skin Care in the Neonatal Period for Healthy Term Newborns' [Guidance for the Clinician in Rendering Pediatric Care] published in 2016 is "...intended for birthing centers and delivery hospitals caring for healthy newborns to assist in the establishment of appropriate SSC and safe sleep policies." The report cites our research findings from **R1** and **R4** and includes an illustration from our side-car crib studies. The recommendations note: "Given the level of disability in mothers who have had a caesarean delivery, side-car technology holds promise for improvement in the safety of the rooming-in environment." Publication of this guidance report led to increased interest in the use of side-car cribs in the United States of America (see **E3**). The AAP has 67,000 members in the United States of America, Canada and Mexico. AAP guidance is used in all birthing centres and hospitals providing maternity care in the United States of America, serving approximately 4million families per year.

The **Academy of Breastfeeding Medicine (ABM)** is an international organisation of clinicians (800 members in 50 countries) that provides guidance to practitioners via the production of clinical protocols and guidelines for managing common medical problems that may impact breastfeeding success, and for the care of breastfeeding mothers and infants. Three of their recent protocols cite our work on postnatal care: **E4a**: *Clinical Protocol #5: Peripartum Breastfeeding Management for the Healthy Mother and Infant at Term, Revision 2013*; **E4b**: *Clinical Protocol #6: Bed-sharing and breastfeeding*; and **E4c**: *Clinical Protocol #7: Model Maternity Policy Supportive of Breastfeeding*. Document **E4a** uses **R1** to support the Immediate Postpartum guideline 2 which states that "Mother-baby rooming-in on a 24-hour basis enhances opportunities for bonding and for optimal breastfeeding initiation. Whenever possible, mothers and infants are to remain together during the hospital stay"; **E4b** cites 20 publications from our team including **R1-R6** to underpin the main case that mother-infant sleep proximity supports breastfeeding; **E4c** uses **R1** & **R4** to support requirements that rooming-in for mothers and babies, and the use of side-car bassinets, should be facilitated within hospitals adopting this policy. **R6** is used to support the need for maternal education and informed choice regarding the proximity of mother and baby in the postnatal period. In 2016 the **United States of America Health Resources and Services Administration (HRSA)** Maternal & Child Health Bureau issued a funding call (HRSA-17-094) for up to USD1,000,000 per year (GBP757,060 08-2016) over 4-5 years for applications for a National Action Partnership to Promote Safe Sleep (NAPPSS) Program with the goal of reconciling conflicting guidelines on safe sleep and breastfeeding promotion to create 'a new *national norm*'. The funding call was live from 19 August 2016 to 27 October 2016 [**E5a** & **E5b**]. The description of purpose for this call cited 3 academic papers illustrating the dynamics of breastfeeding and infant sleep decisions to be addressed, one of which was **R6**, used as evidence that 'all women with a strong motivation to breastfeed frequently bed-share with their infants'. This publication was therefore influential in establishing and shaping this United States of America national programme that aimed to change behaviour on a national scale. Funding was awarded to United States of America-based 'action teams' from 1 July 2017 to 30 June 2022 who will formulate new American guidance.

**Red Nose Australia (formerly SIDS and Kids Charity)** is the Australian safer sleep charity issuing guidance for parents and health professionals on Sudden Infant Death Syndrome (SIDS) risk reduction. They use **R1**, **R2**, **R3**, & **R4** and the Basis (formerly ISIS) website to evaluate the use of portable sleep spaces such as side-car cribs in their 2015 update to the

Red Nose National Scientific Advisory Group Information Statement: *Sharing a sleep surface with a baby* [E6].

### **New Zealand Initiatives for Mother-Baby Proximity in Hospital Settings**

The New Zealand College of Midwives issued a Consensus Statement: *Safe Sleeping for baby* [E7a] (reviewed & updated August 2016) which cites our publications **R1 & R6** in support of their guidance that breastfeeding in a hospital bed is not ideal, and that clip-on cots may assist with this. However clip-on cots are not easily available in New Zealand so the charity Change for our Children devised an in-bed sleep space called a '1<sup>st</sup> days pepi-pod' based on the concept of a side-car/clip-on crib [E7b, E7c], and underpinned by our research findings from **R1 and R4** [E7d].

The **American Academy of Family Physicians** (AAFP) issued a *Position Paper on Family Physicians Supporting Breastfeeding* [E8] in 2014 which demonstrates that our research is being used to underpin the aspiration that all mothers and babies should experience a minimum of rooming-in following birth in United States of America hospital settings, citing **R1** in support of the guidance that physicians should 'advocate for 24-hour rooming in for mother and baby' under their '*Recommendations for Clinical Management*'. The AAFP is a United States of America professional organisation for Family Physicians (GPs) with over 130,000 members throughout the United States of America and its territories. One of their key missions is to advocate for evidence-based family medicine.

The **American College of Nurse-Midwives** (ACNM) *Position Statement on Safe Infant Sleep Practices* [E9] issued in September 2017 summarises the evidence around bed-sharing safety and uses our work from **R6** to argue that bed-sharing makes night-time breastfeeding easier and increases the frequency and duration of breastfeeding. ACNM has 7,000 annual members and is the professional association for United States of America Nurse-Midwives promoting excellence in midwifery education and practice.

### **5. Sources to corroborate the impact** (maximum of ten references)

**E1. Unicef UK Baby Friendly Initiative:** *The evidence and rationale for the Unicef UK Baby Friendly Initiative Standards* (E1a), Unicef UK BFI website: research resources (E1b), *Caring for your baby at night* (E1c), *Co-sleeping & SIDS* (E1d).

**E2. NHS documents** (E2a, b, c), **Spanish NHS** (E2d), and **WHO** (E2e) **policies and guidelines.**

**E3. American Academy of Pediatrics** *Clinical Report 'Safe Sleep and Skin-to-Skin Care in the Neonatal Period for Healthy Term Newborns'* [Guidance for the Clinician]

**E4. Academy of Breastfeeding Medicine** *Clinical Protocol #5: Peripartum Breastfeeding Management for the Healthy Mother and Infant at Term*, Revision 2013 (E4a). *Clinical Protocol #6: Bedsharing and Breastfeeding* Revision 2019 (E4b). *Clinical Protocol #7: Model Maternity Policy Supportive of Breastfeeding* (E4c).

**E5. National Action Partnership to Promote Safe Sleep (NAPPSS) Program** Maternal & Child Health Bureau of the US Department of Health & Human Services, Health Resources and Services Administration (HRSA-17-094) announcement (E5a) and funding call (E5b).

**E6. Red Nose Australia (formerly SIDS and Kids)** Red Nose National Scientific Advisory Group (NSAG) Information Statement: *Sharing a sleep surface with a baby*. 2015.

**E7. NZ College of Midwives** *Consensus Statement: Safe Sleeping for baby* (E8a); **Change for our Children** NZ 1<sup>st</sup> days Pepi-pod 2015 (E8b-d).

**E8. American Academy of Family Physicians** *Position Paper on Supporting Breastfeeding.*

**E9. American College of Nurse-Midwives** *Position Statement on Safe Infant Sleep.*