

Institution: University of Bristol

Unit of Assessment: UoA2

Title of case study: Bristol research leads to a worldwide fall in the number of cot deaths.

1. Summary of the impact
 University of Bristol research has led to a marked and persisting reduction in the number of cot deaths (sudden infant death syndrome or SIDS). The dramatic 67% fall from 1988 to 1992 in England and Wales resulted from the identification of risks associated with putting babies to sleep face-down (prone). Nationally, death rates have more than halved again (54% fall) between from 1992 and 2011, with an estimated additional 1025 lives saved between 2008 and 2011, after two studies conducted in 1993-6 and 2003-6 identified further contributory risk factors. Tens of thousands of SIDS deaths worldwide have been prevented thanks to the team’s research, international collaboration and development of risk-reduction recommendations.

2. Underpinning research
 University of Bristol (UoB) led studies, published in the early 1990s were the first population-based investigations to document the importance of a number of factors (prone sleeping position, wrapping infants too warmly and pre-natal smoking) that contribute to SIDS. Subsequently, two case-control studies were conducted by Peter Fleming (Professor of Infant Health and Developmental Physiology, UoB since 1982) and Peter Blair (Senior Research Fellow, UoB since 1992). Data from the Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) in 1993-6 [1-3] and the South West Infant Sleep Scene (SWISS) study in 2003-6 [4] identified a number of further contributory factors to deaths. These included post-natal smoking, parental drug and alcohol use when bed-sharing, co-sleeping on a sofa, putting the baby to sleep on their side and loose covering found over the infant’s head. The team also identified factors not contributory to the risk of SIDS (e.g. immunisation and toxic gas emanating from mattresses) and some that were beneficial (e.g. infants sleeping in the same room as parents, dummy use and breastfeeding).
 Advice against the prone sleeping position had already been widely adopted prior to CESDI in 1993-6. In the ten years between CESDI and SWISS, prone sleeping position rates did not change, but rates of infants being placed on their side to sleep, infants exposed to tobacco smoke after the birth and infants found with bedding over their heads decreased while rates of infants being placed ‘feet to foot’ (with their feet at the foot of the cot to avoid wriggling under the covers) and infants being breastfed increased suggesting that the subsequent 54% fall in SIDS rates was related to the further contributory factors identified by the UoB team (see table below). [4]

Impact of risk reduction advice in the 10 years between CESDI and SWISS studies				
Risk(R) or Protective(P) Factor	CESDI Study Fleming & Blair 1993-6[1]		SWISS study Blair & Fleming 2003-6[3]	
	SIDS%	Controls%	SIDS%	Controls%
R-Placed prone to sleep	15%	3%	14%	6%
R-Placed on side to sleep	41%	28%	18%	10%
R-Postnatal exposure to smoke	54%	23%	16%	6%
R-Head covered by bedding	16%	3%	5%	0%
P-Feet placed at foot of cot	3%	4%	50%	60%
P-Mother attempted to breastfeed	44%	60%	70%	79%

Evidence from these two population-based, case-control studies ten years apart suggests that the messages from the UoB team have changed parental behaviour. Laboratory and community studies of thermal balance (solely conducted in Bristol) have led to detailed recommendations in current safety guidelines regarding how much bedding infants should have, according to bedroom

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temperature.[4, 5] In the last five years the team has identified potential risks to the baby if they share the same sleep surface and have been working with UNICEF to provide a more evidence-based approach that acknowledges the importance of breastfeeding while outlining specific hazards when bed-sharing deaths occur.

UoB-led studies in the Avon Longitudinal Study of Parents and Children (ALSPAC) study showed no adverse effects from changes in sleeping position advice and findings published in 2010 suggest an interdependent effect with bed-sharing and breastfeeding.[6]

The UoB team also includes PJ Berry (Pathologist 1983-2001), P Sidebotham (Sen Clinical Lecturer 1997-2005) and J Golding (Prof of Paediatric & Perinatal Epidemiology 1985-present).

3. References to the research

[1] Fleming PJ, Blair PS, Bacon C et al. Environment of infants during sleep and risk of the sudden infant death syndrome: results from 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. *BMJ* 1996; 313:191-5 (Document can be supplied upon request)

[2] Blair PS, Fleming PJ et al. Smoking and the sudden infant death syndrome: results from 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. *BMJ* 1996; 313:195-8. (Document can be supplied upon request)

[3] Blair PS, Fleming PJ, Smith IJ et al. Babies sleeping with parents: case-control study of factors influencing the risk of sudden infant death syndrome. *BMJ* 1999;319:1457-61. (Document can be supplied upon request)

[4] Blair PS, Sidebotham P, Evason-Coombe C, Edmonds M, Heckstall-Smith EM, Fleming P. Hazardous cosleeping environments and risk factors amenable to change: case-control study of SIDS in south west England. *BMJ* 2009;339:b3666. DOI:10.1136/bmj.b3666

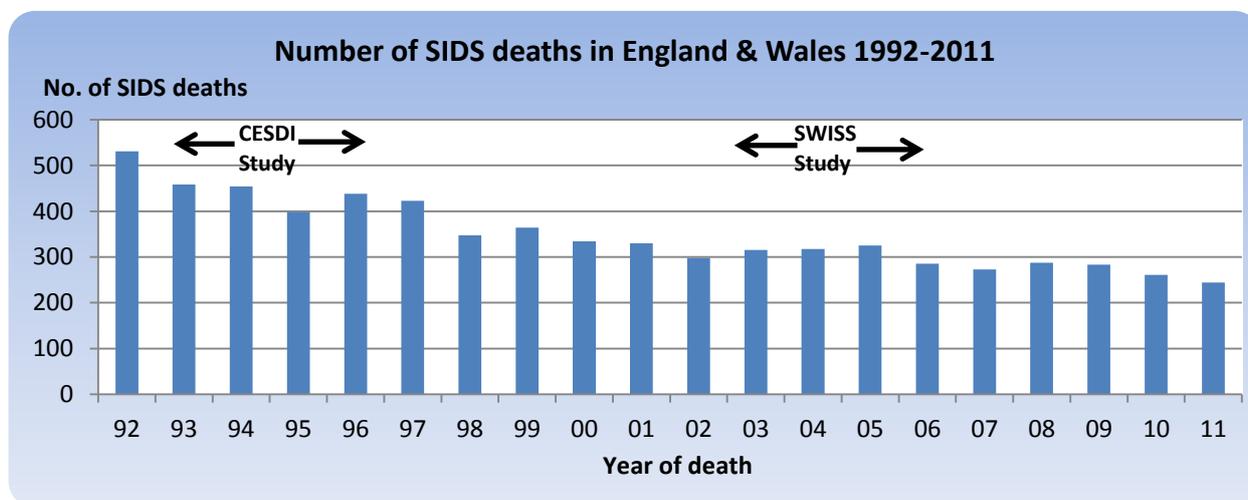
[5] Blair PS, Sidebotham P, Berry PJ, et al. Major epidemiological changes in sudden infant death syndrome: a 20-year population-based study in the UK. *Lancet* 2006;367:314-9. DOI: 10.1016/S0140-6736(06)67968-3

[6] Blair PS, Heron J, Fleming PJ. Relationship between bed sharing and breastfeeding: longitudinal, population-based analysis. *Pediatrics* 2010; 126(5):e1119-26. DOI:10.1542/peds.2010-1277

Peer reviewed grants: UK Department of Health £620,000 (1993-8); FSID Charity £80,580 (1995-6); Babes in Arms Charity £109,500 (2000-6) and Charitable Trusts for UoB £54,000 (2006-7).

4. Details of the impact

Implementation in the UK of SIDS risk reduction programmes based on UoB research findings was followed by a 67% fall in SIDS rates by 1992; the number of SIDS deaths in England and Wales fell from 1597 in 1988 (2.3 deaths per 1000 live births) to 531 in 1992 (0.77 per 1000 live births). As the Figure below shows, the number of deaths fell by a further 54% to 244 by 2011 (0.34 per 1000 live births), the last year for which national data is available.



Publication dates (number of studies): 'CESDI' study - 1995(1), 1996(2), 1999(3), 2000(3), 2001(1), 2002(2), 2003(2), 2004(2), 2006(3) and 2007(1). 'SWISS' study - 2009(1) and 2010(1).

This further fall was not due to any change in prone positioning in England but concomitant with changes in other identified risk factors (see Table in Section 2).

If death rates had remained the same as 1992 over 10,000 infants would have died in England and Wales between 1993 and 2011 rather than the 6434 SIDS deaths that did occur. Over 2,100 would have died from 2008 to 2011 rather than the 1075 deaths that did occur. The persistent year on year fall in SIDS rates over the last two decades has been instrumental in the halving of the post-neonatal infant mortality rate in England and Wales over the same time period (from 2.2 deaths to 1.2 deaths per 1000 live births).

At every stage of this process the UoB researchers have been closely involved: generating the findings; developing the risk-reduction messages; changing statutory law in 2008 on how child deaths are investigated (see below); and collaborating with national and international organisations to ensure families are given accurate information to care for their infants in ways that lead to the lowest possible risk of SIDS. In the last 5 years they have been particularly involved in the translational work of getting their evidence-based findings implemented into public health policy.

In UK [a] and Australian [b] parent information leaflets, every recommendation to reduce the risk of SIDS is based partly or fully on the results of the UoB studies. Collaborative work with other groups in Germany, New Zealand, and Scandinavia has led to the development of standardised protocols for data collection in the investigation of unexpected infant deaths, which in turn have allowed more rapid identification and evaluation of significant changes in parenting practices and their effects.

UoB studies on infant thermal balance have produced charts of optimal thermal conditions adopted by both manufacturers and parents in many countries, and sequential studies show a clear reduction in covering (infant clothes and bedding combined) from an average of 8 tog (unit of thermal resistance) 20 years ago to just 2.4 tog more recently.[4 – page 8]

Fleming and Blair recognise that findings from their studies need to fit with current evidence of infant care practices outside the field of SIDS so that consistent public health messages can be given to parents and health professionals. They have worked closely in the last five years with UNICEF UK [c, d], who are currently promoting breastfeeding in Baby Friendly Hospitals, to produce a leaflet 'Caring for your baby at night' which encourages breastfeeding, acknowledges some parents may want to bed-share but outlines the circumstances in which bed-sharing may be unsafe. An evidence-based guideline for health professionals [e, f] accompanies the leaflet (lead author Blair). The leaflets and guidelines, printed in January 2012, have proved popular - over 210,000 have so far been distributed, mainly to NHS hospitals, trusts and health visiting teams. Blair is a regular invited speaker at health care professional conferences and seminars (see a selection of UK and International lectures since 2008 [g, h, i]) to promote the UoB-based findings.

The UoB approach to the investigation of unexpected infant deaths and the care of families was adopted by the Kennedy Committee which was set up by the Royal College of Pathologists and Royal College of Paediatrics and Child Health to improve the quality of such investigations after a series of miscarriages of justice in 2003, and was subsequently incorporated into the Children Act 2004, becoming a statutory requirement throughout England from 2008. This process of child death reviews (in which Fleming was centrally involved) has led to a major change in the way medico-legal agencies involved in providing services to children interact, with a resultant improvement in the quality of such investigations and services to bereaved families.[j, k]

Fleming was elected as Vice Chair of the International Society for the Study and prevention of Perinatal and Infant Deaths (ISPID) in 2008, succeeded in that role in 2010 by Blair. The Society is instrumental in the delivery of SIDS public health campaigns in different countries. Both have been involved in developing risk reduction messages on the ISPID website (<http://www.ispid.org/>) which

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receives around 300 visits a day. Blair currently helps co-ordinate the website activities and chairs the epidemiology group working towards consensus positional statements on safe infant care practices. Both researchers have worked extensively on the development of internationally agreed policies for parent education and support, and on advice about parenting practices, which have been adopted in many countries.

In 2006 Fleming was included in the “Eureka UK” publication celebrating the 100 most important research achievements of British Universities. In 2009 Blair was awarded an Honorary Fellowship by UNICEF for work in the SIDS field and in 2012 both Fleming and Blair were awarded the UoB Vice-Chancellor Impact award for their translational research in this field. This work has also been instrumental in the UoB receiving the Queen’s anniversary prize for Higher and Further Education in the field of Obstetrics and Neonatal practice in 2012-14.[I]

5. Sources to corroborate the impact

[a] <http://www.lullabytrust.org.uk/document.doc?id=300> UK (FSID now Lullaby Trust). Evidence base for risk reduction messages, PJF and PSB work cited 15 times

[b] <http://www.sidsandkids.org/wp-content/uploads/SidsSafeSleeping14ppa1.pdf> Australian SIDS and Kids leaflet. PSB and PJF acknowledged for their work on the last page

[c] Letter of support from Sue Ashmore, Programme Director, UNICEF UK Baby Friendly Initiative

[d] <http://www.unicef.org.uk/BabyFriendly/News-and-Research/Research/Cot-death/Study-draws-link-between-increased-risk-of-SIDS-and-alcohol-or-drug-use-when-co-sleeping/> and <http://www.unicef.org.uk/BabyFriendly/News-and-Research/Research/Cot-death/Research-concludes-no-increase-in-risk-of-cot-death-from-bed-sharing-for-infants-over-14-weeks-with-non-smoking-parents/> Exemplars of involvement with UNICEF UK including website reporting research conducted by PJF and PSB regarding both the hazards of bed-sharing and when bed-sharing is safe.

[e] <http://www.unicef.org.uk/BabyFriendly/Resources/Resources-for-parents/Caring-for-your-baby-at-night/> Caring for your baby at night leaflet: (UNICEF 2012) both PJF and PSB were instrumental in advising on the contents of this leaflet.

[f] http://www.unicef.org.uk/Documents/Baby_Friendly/Leaflets/HPs_Guide_to_Coping_At_Night_Final.pdf Health profession guidelines to the UNICEF leaflet. PSB is the lead author.

[g] http://www.unicef.org.uk/Documents/Baby_Friendly/Programmes/3/08programme.pdf PSB gives talk to 500 health professionals in Glasgow 2008, Page 3, abstract page 8 of programme.

[h] <https://www.dur.ac.uk/sleep.lab/sim/> PSB gives talk in Durham, 2012, similar talks given in Bristol 2012 and 2013.

[i] Flyer listing a series of seminars delivered to health professionals in Australia (program 2: Sydney, Adelaide and Perth) in 2012 by PSB

[j] <http://www.rcpath.org/publications-media/publications/sudden-unexpected-death-in-infancy> The Kennedy Report. PJF was a member of the committee that wrote this report and helped write chapter 7, on investigating childhood deaths.

[k] <http://www.education.gov.uk/childrenandyoungpeople/safeguardingchildren/childdeathreview/a0068831/why-jason-died-a-dvd-familiarisation-resource> A DVD: “Working together to safeguard children” 2010. PJF is featured extensively in the accompanying DVD.

[l] Letter of award to UoB for the Queen’s Anniversary Prizes for Higher and Further Education for 2012-14 (Obstetrics and Neonatal Practice- Saving Babies lives around the world).