



Safe infant sleep practices: Reducing sleep-related deaths in infancy

Defining sleep-related deaths in infancy

For the past five decades, the majority of sleep-related deaths in infancy have been attributed to Sudden Infant Death Syndrome (SIDS). SIDS is defined as “the sudden death of an infant less than one year of age, which remains unexplained after a thorough investigation, including the performance of a complete autopsy, an examination of the death scene, and a review of the clinical history” (Willinger, James & Catz, 1991).

Recently other terms have also been introduced. “Terms such as sudden unexplained infant death (SUID) and sudden unexpected death in infancy (SUDI) have emerged in an attempt to group all infant deaths possibly related to the infant sleeping environment. Definitions of these terms have not been consistent enough to make them universally acceptable” at this time.

(Public Health Agency of Canada, 2011)

What is the issue?

Research is helping us better understand why apparently healthy babies die suddenly and unexpectedly during sleep. This issue continues to be a significant cause of death in the post-neonatal period (between one month and one year of age). At last report, Sudden Infant Death Syndrome (SIDS) was the third-leading cause of post-neonatal death in Canada, accounting for 17.2% of post-neonatal deaths in the country (Public Health Agency of Canada, 2008). In Alberta, there were at least 172 sudden unexpected infant deaths in sleep-related circumstances between 2005 and 2010 (Office of the Chief Medical Examiner, 2011).

What are sleep-related infant deaths?

For the past five decades, the majority of sleep-related deaths in infancy have been attributed to SIDS. Recently other terms (see sidebar) have also been introduced.

SIDS is defined as “the sudden death of an infant less than one year of age, which remains unexplained after a thorough investigation, including the performance of a complete autopsy, an examination of the death scene, and a review of the clinical history” (Willinger, James & Catz, 1991). However, if risk factors are present at the death scene, medical examiners increasingly attribute the death to a classification other than SIDS. This change in practice has presented challenges to data gathering and surveillance.

Regardless of how the death is classified, the phenomenon of sudden, unexpected infant death during sleep continues to be an issue.

As health professionals, we are concerned with helping prevent all sudden, unexpected infant deaths in sleep-related circumstances, including but not limited to SIDS.

What is the relationship between sudden, unexpected, sleep-related deaths and infant sleep practices?

The Back to Sleep public health campaign of the late 1990s encouraged parents to put babies on their back to sleep, and is credited with a sharp decline in the rate of SIDS. There is evidence that this campaign contributed to a 50% decrease in SIDS in Canada between 1999 and

Unsafe Sleep Practices and Infant Deaths

In British Columbia, between January 2003 and June 2004, 63% of infant deaths occurred during sleep, and of those, 83% involved one or more unsafe sleep practice (bed-sharing with at least one person, sleeping on a surface not intended for child sleep, sleeping in a prone or semi-prone position or sleeping with items covering the head).

In 40% of these deaths, two or more unsafe practices were evident, with the most common combination being sleep on a surface unintended for child sleep and bed-sharing (British Columbia Coroners Service, 2005).

In Alberta, between 2005 and 2010, there were at least 172 sudden unexplained infant deaths during sleep. Of those, 114 were classified as SIDS, and 48 as SUD, SUDI or unexplained or natural causes. Co-sleeping with a parent or sibling was a factor in 42% of the deaths classified as SIDS and in 74% of the other deaths (Office of the Chief Medical Examiner, 2011).

2004 (Public Health Agency of Canada, 2008). However, international research shows that the decline in SIDS has plateaued in recent years, with a concurrent rise in sleep-related deaths from other causes, such as asphyxiation, suffocation and entrapment (American Academy of Pediatrics, 2011a). Between 1996 and 2004, infant mortality rates in the United States attributed to accidental suffocation and strangulation in bed increased dramatically, by an average annual percent increase of 14% (Shapiro-Mendoza, Kimball, Tomachek, Anderson & Blanding, 2009).

Many of the risk factors for SIDS are shared by other types of sleep-related deaths. As a result, health authorities around the world have expanded their recommendations from a sole focus on SIDS to “focusing on a safe sleep environment that can reduce the risk of all sleep-related deaths, including SIDS” (American Academy of Pediatrics, 2011a).

Who is affected?

Sudden infant death during sleep can happen to any infant in any demographic, but these deaths are more often seen in infants/families with the following characteristics:

Infant Characteristics: Male gender, prematurity, low birth weight and admission to a neonatal unit all put an infant at increased risk. Developmental stage also plays a role; the majority of SIDS deaths occur in the first six months, and incidence peaks between two and four months of age.

Maternal Characteristics: Smoking, using alcohol and/or drugs during pregnancy, the late initiation of prenatal care, not attending prenatal classes, young maternal age, single parenthood, having multiple children and lower socioeconomic status are all maternal factors that increase risk.

Population Characteristics: The rate of SIDS in Canada is higher in First Nations populations, as it is in indigenous communities in other jurisdictions, including the United States, Australia and New Zealand (Gracey & King, 2009). Among First Nations in Alberta, the incidence is about two to three times higher than that of the general population (Mitchell, 2006).

What are the known risks?

Prone sleep (sleeping face down) puts infants at high risk of sleep-related death. Five separate studies have found odds ratios ranging from 2.3 to 13.1 (American Academy of Pediatrics, 2011a).

Research has also indicated that infants unaccustomed to sleeping prone who are placed in this position are at even higher risk than those who usually sleep prone. This indicates the importance of placing the infant to sleep on his/her back for every sleep (American Academy of Pediatrics, 2011a). A side-lying position is also a risk (Li et al., 2003), as it is an unstable position from which the infant can easily slip into prone sleep.

Smoking appears to be highly correlated with SIDS and is a substantial risk if one or both parents smoke before, during or after birth. Maternal smoking during pregnancy is a major risk factor. Aside from sleep position, exposure to smoke is the largest contributing risk factor for SIDS (Kemp et al., 2000; American Academy of Pediatrics, 2011a).

Alcohol/Drug Use/Excessive Fatigue are all associated with an increased risk of SIDS. In addition to the risk caused by prenatal exposure to drugs and alcohol, these three factors substantially increase the risk associated with parent/infant bed-sharing as they impair parental judgement and alertness (American Academy of Pediatrics, 2011a).

Unsafe Sleep Surfaces, such as sofas, waterbeds, couches or day beds, pose an increased risk for SIDS whether the baby is with a parent or alone. One study found that the risk of suffocation for infants who slept in adult beds was 40 times higher than those who slept in cribs (Scheers, Rutherford & Kemp, 2003). Oxygen saturation rates in newborns have been found to be lower among infants in car seats and car beds as compared to hospital cribs (Kornhauser et al., 2009). When sleeping in a car seat or other sitting device, a young infant's head can fall forward and constrict his or her airway (Côté, Bairam, Deschesne & Hatzakis, 2008). These items therefore should be used only for their intended purpose and not as replacements for cribs.

Bed sharing in all forms has risks. Having an infant sleeping on the same surface with another person (adult or child) increases the risk of sudden, unexpected infant death. Adult beds are not designed for infant sleep and present many dangers, including entrapment, overlying, suffocation, strangulation and falls. Risk from bed-sharing is highest for infants under three months (whether or not parents are smokers), and for babies who are born premature or with low birth weight (American Academy of Pediatrics, 2011a). Bed-sharing for infants 30 – 61 days old with non-smoking parents increases the risk of SIDS nine-fold (Ruys, Jonge, Brand, Engelberts & Semmekrot, 2007).

Bedding/Soft Covers/Bumper Pads/Pillows are suffocation and strangulation risks. Research has shown that a soft sleep surface where the infant's head would sink 1 inch or more into the surface poses five times the risk of SIDS, while the use of a pillow or covering the head or face with bedding poses three times the risk (Hauck et al., 2003). Additionally, the risk of SIDS increases 21-fold

when the baby was placed in a prone position with soft bedding (American Academy of Pediatrics, 2011a).

Overheating increases the risk of SIDS and is a risk independent of prone sleeping (Ponsonby et al., 1992). Layered clothing, blankets, elevated room temperature and head covering all contribute to overheating. Babies sleeping in a prone position have a higher risk of overheating. Babies are safest in a room temperature that is comfortable for adults in light clothing (Public Health Agency of Canada, 2011; Canadian Paediatric Society, 2004, reaffirmed 2011; American Academy of Pediatrics, 2011a).

What is the concern about bed-sharing?

Bed-sharing is a sleeping arrangement in which the infant shares the same sleeping surface with another person, such as a parent or sibling (Canadian Paediatric Society, 2004, reaffirmed 2011). This includes surfaces such as mattresses, sofas, futons, waterbeds and armchairs. **Bed-sharing is not recommended by Alberta Health Services.**

Bed-sharing in all forms has risks. Situations that carry the highest risk to babies (American Academy of Pediatrics, 2011a) should always be avoided. These include bed-sharing when:

- on a sofa or similar soft, padded surface
- one or both parents are smokers
- the parent is overtired or the parent has consumed medications or substances, such as drugs (over-the-counter, prescription or illicit) or alcohol, that can impair judgment and the parent's ability to arouse or respond
- the infant is younger than three months or was born premature or low birth weight
- the infant is bed-sharing with someone who is not a parent
- there are multiple bed-sharers

Parents may choose to feed or comfort their child in an adult bed. Babies brought into bed for feeding or comfort are safer when put back in a crib for sleep before the parents go to sleep.

Room-sharing is a sleeping arrangement in which the infant sleeps in the same room as the parent but does not share the same sleeping surface with another person, such as a parent or sibling. Room-sharing is recommended for at least the first six months (Canadian Paediatric Society, 2004, reaffirmed 2011).

What If Families Are Considering Bed-sharing?

The health care professional's role is to provide information so that families can make informed decisions. If parents are unable to provide a crib, cradle or bassinet, they need to consider the following:

- Place the baby to sleep on his or her back on a firm, flat surface.
- Avoid soft surfaces, such as water-filled, air-filled, pillow-top or sagging mattresses. Do not use sofas or upholstered chairs, or any loose bedding.
- Prevent falls; never leave a baby alone on a raised surface.
- Make sure the baby cannot get trapped between the mattress and headboard, footboard, wall or anything else.
- Keep blankets and pillows far away from the baby and make sure his or her head is not covered.
- Prevent overheating; keep the room comfortably cool.
- Keep other children and pets out of the bed.
- Know where the infant is at all times. If sharing a bed with a partner, make sure he or she knows the baby is in the bed.

Taking these steps might reduce risk, but parents must be aware that they do not make bed-sharing safe.

Parents who cannot provide a crib can talk to their public health nurse or Health Link Alberta to find out where they can get help.

Bed-sharing is not recommended by Alberta Health Services, the Canadian Paediatric Society or the Public Health Agency of Canada.

What are the benefits associated with room-sharing?

- Research has found that infants who sleep in the same room as their parents have a lower risk of SIDS (Tappin, Ecob & Brooke, 2005). Room-sharing without bed-sharing decreases the risk of SIDS by as much as 50%, and infants who room-share have a lower risk of SIDS than infants who do not room-share (Scragg et al., 1996). These protective effects are not seen when the infant shares a room with another child (Scragg et al., 1996).
- Room-sharing is safer than bed-sharing. It provides the benefits of close monitoring and easy access for feeding and comforting without the risks of bed-sharing. Room-sharing is most likely to prevent strangulation, suffocation or entrapment that might occur if the infant is sleeping in an adult bed (American Academy of Pediatrics, 2011b).
- Room-sharing with an adult is also associated with a reduced risk from prone sleep position (Scragg et al., 1996).

The safest place for a baby to sleep is on his or her back, in a crib, close to his or her parents' bed.

What are the key messages to promote safe sleep in baby's first year?

Put baby on back to sleep for every sleep

- Encourage parents and caregivers to place infants to sleep on their backs for the first year of life, whether nap time or nighttime.
- Parents and caregivers should continue this practice for the first year, even when babies have learned to roll over on their own (usually around six months). If the baby rolls over on his or her own during sleep, it is not necessary to reposition to the back. Infants this age will find their own best position for sleeping.
- Newborn infants should be placed on their back to sleep beginning with their first sleep after birth (American Academy of Pediatrics, 2011a) unless instructed otherwise by the baby's doctor or healthcare professional (for example, Pierre Robin Sequence).
- Supine sleep should be well established before discharge from the hospital.

Choose a safe place

- Babies need a firm, flat, uncluttered surface for sleeping to reduce the risks of SIDS, being trapped or smothering.
- The safest place for a baby is a crib, cradle or bassinet (see sidebar on next page) that meets Canadian government safety standards, and is assembled and used according to manufacturer's instructions. Crib, cradle and bassinet standards can be found at: www.healthcanada.gc.ca/cps
- Bumper pads should not be used (Canadian Paediatric Society, 2004, reaffirmed 2011; American Academy of Pediatrics, 2011b).

Parents should be advised to keep their infant's sleep environment free from soft materials such as pillows, duvets, quilts, comforters and stuffed animals (Public Health Agency of Canada, 2011).

- Advise parents that car seats are not meant for long periods of sleep, and to take the baby out of the car seat when they get to their destination.

Keep baby warm, not hot

- Babies are safest when the room temperature is comfortable for an adult wearing light clothing.
- Avoid covering the infant's head (Blair, Mitchell, Heckstall-Smith & Fleming, 2008).
- A fitted one-piece sleeper reduces the need for additional blankets (PHAC, 2011). If parents use a sleep sack, they should make sure it fits properly around the arms, shoulders and chest so it doesn't ride up around the baby's neck and become a choking hazard.
- If parents use a blanket, advise them to make sure it is lightweight, firmly tucked under the end of the mattress and reaches only to the baby's chest (American Academy of Pediatrics, 2011a).

Clear the air

- Encourage parents, particularly mothers, to quit smoking and to ensure that no one smokes around the infant at home, during travel or with other caregivers.
- Parents or caregivers who would like to quit smoking can visit www.albertaquits.ca or call 1-866-710-QUIT.

Make baby a roommate

- Placing the infant's crib, cradle or bassinet close to where the parent(s) sleep helps protect against SIDS.
- Room-sharing also allows for ease of breastfeeding and increases opportunities to comfort the baby. It is a safer alternative to bed-sharing.
- Alberta Health Services, the Canadian Paediatric Society and the Public Health Agency of Canada recommend room-sharing until the infant is at least six months old.

Breastfeeding helps

- Recent evidence indicates that breastfeeding to any extent and of any duration helps protect against SIDS and that the protective effect is strongest with exclusive breastfeeding (Hauck, Thompson, Tanabe, Mood & Vennemann, 2011).
- Exclusive breastfeeding for the first six months may reduce the risk of SIDS by up to 50% (Vennemann et al., 2009).
- Whether nursed or expressed, breast milk is protective.

Encourage parents to share their safe infant sleep plan with anyone else that provides care for their baby (e.g., grandparents, child care providers, babysitters).

A safe crib

A safe crib (cradle or bassinet) is in good condition and has

- a firm, flat mattress no more than 15 cm (6 inches) thick for a crib, or 3.8 cm (1½ inches) thick for a cradle or bassinet, has no rips or tears and fits snugly into the frame
- a tight-fitting bottom sheet
- slats that are no more than 6 cm (2 3/8 inches) apart
- a sticker saying it was made after September 1986
- no pillows, bumper pads, plastic mattress covers, heavy blankets, quilts or sheepskins, toys or stuffed animals or positioning devices, wedges or rolls

Preventing Plagiocephaly

A possible consequence of infants consistently sleeping on their back is positional plagiocephaly, or flat spots on the baby's head, but this is also related to infants spending more time in baby equipment (e.g., swings, seats, strollers). Frequent tummy time during the day—when the baby is awake and supervised—will help prevent plagiocephaly, strengthen muscles and foster development. Advise parents to use alternate holds, place baby's head at opposite ends of the crib on alternating days and ensure that the baby has frequent supervised tummy time while awake each day.

For more information on preventing plagiocephaly, visit www.albertahealthservices.ca/1585.asp

References

- American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome. (2011a). SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment. Technical Report. *Pediatrics*, 128, e1341–e1367.
- American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome. (2011b). SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment. Policy Statement. *Pediatrics*, 128, 1030–1039.
- Blair, P. S., Mitchell, E. A., Heckstall-Smith, E. M. A., & Fleming, P. J. (2008). Head covering a major modifiable risk factor for sudden infant death syndrome: A systematic review. *Archives of Diseases in Childhood*, 93(9), 778–783.
- British Columbia Coroners Service, Child Death Review Unit. (2005). *Special Report: Infant Deaths 2003–2004*.
- Canadian Paediatric Society. (2004, reaffirmed 2011). Recommendations for Safe Sleeping Environments for Infants and Children. *Paediatrics & Child Health*, 9, 659–663.
- Côté, A., Bairam, A., Deschesne, M., & Hatzakis, G. (2008). Sudden infant deaths in sitting devices. *Archives of Disease in Childhood*, 93(5), 384–389.
- Gracey, M. & King, M. (2009). Indigenous health part 1: determinants and disease patterns. *The Lancet*, 374, 65–75.
- Hauck, F. R., Herman, S. M., Donovan, M., Iyasu, S., Moore, C. M., Donoghue, E., Kirshner, R. H., & Willinger, M. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago infant mortality study. *Pediatrics*, 111, 1207–1214.
- Hauck, F. R., Thompson, J. M. D., Tanabe, K. O., Mood, R. Y., & Vennemann, M. M. (2011). Breastfeeding and reduced risk of sudden infant death syndrome: A meta-analysis. *Pediatrics*, 128, 103.
- Kemp, J. S., Unger, B., Wilkins, D., Psara, R. M., Ledbetter, T. L., Graham, M. A., Case, M., Thach, B. T. (2000). Unsafe sleep practices and an analysis of bedsharing among infants dying suddenly and unexpectedly: Results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Pediatrics*, 106, e41.
- Kornhauser Cerar, L., Scirica, C. V., Štucin Gantar, I., Osredkar, D., Neubauer, D., & Kinane, T. B. (2009). A comparison of respiratory patterns in healthy term infants placed in car safety seats and beds. *Pediatrics*, 124, e396–e402.
- Li, D. K., Petitti, D. B., Willinger, M., McMahon, R., Odouli, R., Vu, H., & Hoffman, H. J. (2003). Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *American Journal of Epidemiology*, 157, 446–455.
- Mitchell, I. (2006). Data presented at International Infant Death Conference, Japan.
- Office of the Chief Medical Examiner. (2011). Report requested by Dr. Andrews and the Alberta Children's Hospital Pediatric Death Review Committee.
- Public Health Agency of Canada. (2011). Joint statement on safe sleep: preventing sudden infant deaths in Canada.
- Public Health Agency of Canada. (2008). *Canadian Perinatal Health Report 2008*.
- Ponsonby, A. L., Dwyer, T., Gibbons, I. E., Cochrane, J. A., Jones, M. E., & McCall, M. J. (1992). Thermal environment and sudden infant death syndrome: Case-control study. *British Medical Journal*, 204, 277–282.
- Ruys, J. H., Jonge, G. A., Brand, R., Engelberts, A., & Semmekrot, B. A. (2007). Bed-sharing in the first four months of life: A risk factor for sudden infant death. *Acta Paediatrica*, 96, 1399–1403.
- Scheers, N., Rutherford, W., & Kemp, J. (2003). Where should infants sleep? A comparison of risk for suffocation of infants sleeping in cribs, adult beds, and other sleeping locations. *Pediatrics*, 112, 883–889.
- Scragg, R. K. R., Mitchell, E. A., Stewart, A. W., Ford, R. P. K., Taylor, B. J., Hassall, I. B., Williams, S. M., Thompson, J. M. D., for the New Zealand Cot Death Study Group (1996). Infant room-sharing and prone sleep position in sudden infant death syndrome. *The Lancet*, 347, 7–12.
- Shapiro-Mendoza, C. K., Kimball, M., Tomachek, K. M., Anderson, R. N., & Blanding, S. (2009). US infant mortality trends attributable to accidental suffocation and strangulation in bed from 1984 through 2004: Are rates increasing? *Pediatrics*, 123, 533–539.
- Tappin, D., Ecob, R., & Brooke, H. (2005). Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: A case-control study. *Journal of Pediatrics*, 147, 32–37.
- Vennemann, M., Bajanowski, T., Brinkmann, B., Jorch, G., Yucesan, K., Sauerland, C., & Mitchell, E. A. and the GeSID Study Group. (2009). Does breastfeeding reduce the risk of sudden infant death syndrome? *Pediatrics*, 123, e406–e410.
- Willinger, M., James, L. S., & Catz, C. (1991). Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatric Pathology*, 11, 677–684.