information statement

red nose
saving little lives

room temperature

Red Nose does not recommend a specific room temperature for healthy babies

Sudden Unexpected Death in Infancy (SUDI) refers to all cases of sudden and unexpected death in infancy and includes deaths from Sudden Infant Death Syndrome (SIDS) and fatal sleeping accidents. Safe sleeping recommendations target known risk factors associated with SUDI. Where studies specifically define the population as SIDS, this specific term will be used to describe the study findings.

key points

- Babies control their temperature predominantly through the face and head. Sleeping baby on the back with the head and face uncovered is the best way to protect baby from overheating.
- It is not necessary to monitor the room temperature or to leave the heating or cooling on all night, as long as the baby is dressed appropriately for the room temperature.
- Dress baby as you would dress yourself – comfortably warm, not hot or cold.
- A good way to check baby's temperature is to feel the baby's back or tummy, which should feel warm (don't worry if baby's hands and feet feel cool, this is normal). If baby is showing signs of heat stress, remove some bedding or clothing. This may be necessary if baby is unwell, in which case you should seek medical attention.
- Ensure that baby's head and face cannot become covered - do not use bedding such as duvets, pillows, bumpers, lambs' wool, or have soft toys in the cot or where the baby is sleeping.
- A good way to avoid face covering is to use a safe baby sleeping bag (one with fitted neck, armholes or sleeves and no hood).

- If using bedclothes rather than a sleeping bag, it is the best to use layers of lightweight blankets that can be added or removed easily according to the room temperature and which can be tucked underneath the mattress. The bed should always be made up so that the baby is at the foot of the cot to avoid any chance of the face or head becoming covered by bedding.
- Remove baby's bonnet, beanie, hood or hat as soon as you go indoors or enter a warm car, bus or train, even if it means waking the baby.
- Never use electric blankets, wheat bags or hot water bottles for babies.
- Never leave baby in a car to sleep without supervision.

Thermal stress (overheating) has been implicated in SUDI for many years and avoiding overheating has been one of the strategies to reduce the risk of SUDI.

With the advent and marketing of nursery thermometers and suggested bedding configurations, parents may think they must maintain a specific room temperature in order to reduce the risk of SUDI. In Australia, it is usually not necessary to measure room temperature.

There is some evidence to show that very high environmental temperatures may increase the risk of SIDS, with a recent study reporting that maximum daily outdoor temperatures greater than 29°C recorded in Canada between 1981 and 2010 were associated with a 3 times greater odds of SIDS compared to 20°C. There was a higher odds ratio in older babies aged 3-12 months compared to younger babies aged 1-2 months.[1] This finding is in contrast to earlier studies which did not find any increased rates of SIDS during a heat wave in the USA[2] or in relation to elevated maximum temperatures in Taiwan.[3]

With regards to the use of a fan in the baby's bedroom, a case controlled study of 185 SIDS babies and 312 controls found that the use of a fan was associated with a 72% reduction in SIDS risk.[4] The reduction in risk was more pronounced in adverse sleeping environments. For example, when room temperatures were greater than 21°C, there was a 94% decreased risk of SIDS compared to no fan use. Fan use was also associated with reduced SIDS risk at lower room temperatures less than 21°C. The mechanism for this protective effect is unknown, but the authors suggested that fan use may reduce rebreathing of exhaled carbon dioxide trapped near a baby's airway by bedding.

To date, there is no evidence to show that maintaining a specific room temperature prevents SUDI and that thermal factors are implicated in SIDS as long as:

- The baby is placed to sleep on the back
- The baby is dressed appropriately for the room temperature (not over or under dressed)
- The baby's head and face remain uncovered

head and face covering

Studies show that the risk of SUDI increases when a baby's face becomes covered by bedding, e.g. sheets, blankets, quilts and duvets.[5-8] In 1996, Fleming and colleagues found that babies who died were more heavily wrapped than control infants who did not die, with the risk increasing as the tog value (a measure of thermal resistance or insulation) increased. A small but significant proportion of these babies also wore a hat to sleep. Compared to controls, significantly more babies who died were found at the bottom of the bed, more were found with covers over their heads, and of these, more were sleeping under duvets.[7]

In a review of the 10 papers published on head covering and SIDS which covered the period between 1958 and 2003, all studies showed an increased risk for SIDS with a prevalence of head covering among SIDS victims ranging from 13% to 48% with a mean of 25%.[9] In control infants who did not die, the prevalence was 0% to 6%, mean 3.2%. The overall increased risk for SIDS was 17-fold – this is 5 times higher than that for prone sleeping and maternal smoking. Parents in four studies reported that over a quarter of SIDS and control infants had previously been found with their heads covered.[10]

Babies regulate their temperature primarily through their head, particularly their face. In a heavily wrapped baby, 85% of total heat loss is through the face.[11] If this normal method of heat loss is restricted by bedding covering the face, wearing a bonnet, hat, hood or beanie or tummy sleeping (partial face covering by mattress and/or bedding), there is a significantly increased chance for thermal stress to occur.

Tuffnel and colleagues demonstrated that heat loss in tummy sleeping babies is 60% less effective than for non tummy sleeping babies with the same insulation values for clothing and bedding.[12] This may explain why researchers found that tummy sleeping in combination with increased body insulation increased the risk of SIDS,[13-15] particularly in rooms where the heating was left on.[7,15] Hauck and colleagues found that tummy sleeping in combination with a soft bedding surface increased the risk of SIDS more than 20 times.[16]

The mechanism responsible for death when the face and head becomes covered is not entirely clear. Covering of the face and head could be associated with elevated body and brain temperatures. Physiological studies of head covering have shown that, despite only small increases in body temperature, there are significant impairments in the autonomic control of both the respiratory and cardiovascular systems when babies' faces are covered by only a sheet.[17] There are also more frequent falls in oxygen levels and rebreathing of carbon dioxide when babies' heads are covered.[18] It is also known that babies have depressed arousal from sleep when the face is covered, **even for babies sleeping in the back position**.[19] Arousal from sleep is an important protective response to life-threatening stimuli and failure to arouse from sleep is thought to be a possible mechanism leading to SIDS.[20]

Although evidence demonstrates an increased risk of SIDS where there is a combination of tummy sleeping, increased thermal insulation and room heating, there appears to be no association between SIDS and high external environmental temperatures[2] as long as the baby is not over insulated and is able to cool down by evaporation of sweat. Sweating is one of the most important defenses against overheating and the combination of sweating with red skin may be indicative of overheating.[21]

bed-sharing and head covering

Sharing a sleep surface or bed-sharing with a baby can increase the risk of SUDI and fatal sleeping accidents. Studies have suggested that more than half of all SUDI cases occur whilst the baby is sharing a sleep surface.[22-29] Some physiological studies have shown that head covering was more common when infants slept in the parental bed compared to when they slept alone in their own cot[30] and more frequent falls in oxygen levels and rebreathing of carbon dioxide occurred.[31]

bedding for babies who have a cold

Research has shown that babies with symptoms of a common cold are often given more bedding than they need due to care giver concerns that babies showing signs of a cold need to be kept very warm.[32] In fact, providing assistance to babies with a common cold to effectively regulate their temperature is very important. This can be best achieved by placing them on the back to sleep with the head uncovered and removing some bedding or clothing. If baby is overly warm to touch, or showing signs of heat stress (irritability, looking unwell, floppy, drier skin, refusing to drink or having fewer wet nappies than usual) then see your doctor or health professional immediately.

conclusions

There is strong evidence to show that tummy sleeping significantly increases the risk of SUDI, particularly when the head or face becomes covered. Likewise, there is good evidence to show that the risk also increases for babies who sleep on their backs if their head or face becomes covered. However, there is no evidence to show that extra thermal insulation increases the risk of SIDS in babies who sleep on their back with the head and face uncovered.[14] There is also no evidence to support maintaining a specific room temperature or any specific bedding configurations (number of blankets required) as this depends on a number of factors such as what the baby is wearing, whether it is summer or winter and whether there is heating or cooling within the room where the baby is sleeping.

The Red Nose Safe Sleeping program is based on scientific evidence and was developed by Australian SUDI researchers, paediatricians, pathologists, and child health experts with input from overseas experts in the field.
The 80% drop in SIDS deaths and the more than 9,000 lives that have been saved is testament to the effectiveness of the program.

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to reduce the risks of SIDS and fatal sleep accidents

1. Sleep **baby on the back from birth**, not on the tummy or side
2. Sleep baby with **head and face uncovered**
3. Keep baby **smoke free** before birth and after
4. Provide a **safe sleeping environment** night and day
5. Sleep baby in their **own safe sleeping place** in the **same room as an adult care-giver** for the first six to twelve months
6. **Breastfeed** baby

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