

## Temperature and Room Temperature - The Research

Thermal regulation is the balance between internal (endogenous) heat production, and heat loss. Thermal stress is a threat to one's thermal regulation. In an infant, heat production depends on metabolism, thermogenesis and fever. Heat loss is determined by many factors, such as the ambient temperature of the room, heat sources, other people in close proximity, insulation, sweating and vasoconstriction<sup>1</sup>.

Though concerns around an infant having fever were raised in sudden infant death syndrome (SIDS) research in the mid 20th Century, in 1984 it was posited that any thermal stress could increase the risk of death<sup>2</sup>. Subsequent work found that leaving the heating on all night<sup>3</sup> gave a nearly threefold increase in the risk of SIDS.

An increased room temperature is directly linked to the internal temperature of an infant<sup>4</sup> and temperature regulation is still developing during the first months of life<sup>5</sup>. An infant is therefore vulnerable to thermal stress, and this is worse in winter, as parents seek to combat the outside temperature by both heating the room and adding further warm layers to the infant<sup>6</sup>.

Though in studies in the 1990s and 2000s showed SIDS tended to occur less frequently in summer months, studies have explored whether rising temperatures are also a source of thermal stress. Research has so far been conflicting. Two studies in Taiwan, with data from 1981 to 1991 and 1994 to 2003, showed that there was a decreased risk of SIDS with an increase in the daily average and daily maximum temperatures<sup>7,8</sup>. Similar results were found in the USA<sup>9,10</sup>.

However, a study of data over 30 years in Montreal, Canada, showed a "U-shape" risk, lowest at around 20°C, for infants over 3 months old, indicating a risk of SIDS at higher ambient temperatures as well as low ones<sup>11</sup>. A similar study in the USA found an increase in the ambient temperature in summer was associated with an increased risk of SIDS, especially for infants over 3 months and Black infants<sup>12</sup>. This study was repeated with data from Vienna, a comparable city, and was not found to be significant<sup>13</sup>. It is also notable that seasonal variation in SIDS is not currently observed in the UK<sup>14</sup>.

There is only one available study on the impact of a fan in the infant's sleeping room. This suffered from extensive missing data, though found a reduced risk of SIDS compared with matched controls, after adjusting for confounding factors<sup>15</sup>.

The optimum temperature for an individual infant varies widely enough for no specific value to be recommended for all infants. Instead, the ideal temperature is one where the infant's internal warming and cooling control systems operate at minimum<sup>16</sup>. In practice, this will be an infant who is warm to touch but not sweating. This is reflected in research that found that an infant who died from SIDS was 2.5 times more likely to be found sweating than a case-controlled matched infant<sup>17</sup>.

The effect of other factors which are known to increase the risk of SIDS, can layer with thermal stress. The risk of SIDS in an infant sleeping on their front (prone position), is made worse by sleeping in an overheated room<sup>18</sup>, potentially because sleeping in this position is associated with a higher skin temperature in infants<sup>19</sup>, and thus this position might increase the impact of thermal stress. Prematurity is also an independent risk factor for SIDS, and these babies have observable changes to their physiological systems at higher ambient temperatures<sup>20</sup>. Similarly, concerns have been raised about the combination of exposure to smoking and thermal stress, and infants who are unwell with a respiratory illness<sup>21,22</sup>.



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## Frequently asked questions

### What does the research show?

Infants are still developing their ability to regulate temperature, which makes them more vulnerable to overheating. Studies have shown that thermal stress, such as keeping the heating on overnight or adding lots of extra layers, can increase the risk of SIDS. Research on how outdoor temperatures affect SIDS has been mixed: some studies found fewer deaths on warmer days, while others reported increased risk at both very high and very low temperatures, especially in older infants. There is no single “ideal” room temperature for all babies. Instead, a baby should feel warm but not sweaty. Overheating can also amplify other SIDS risks, including sleeping on the stomach, prematurity, exposure to smoke, and respiratory illness.

### How should I keep baby cool in summer?

We appreciate how difficult to manage room temperature in the warmer months, knowing that overheating can pose a risk. If the room where the baby sleeps is difficult to cool, follow the ‘summer rules’ of lighter bedding and clothing and open the bedroom door and a window, if it’s safe to do so. You could also use a fan to cool the room, but don’t aim it directly towards the baby, as it might make the baby too cold.

When the weather is hot, it’s important to make sure that your baby has plenty of fluids. Fully breastfed babies don’t need any extra water until they start eating solid food but during hot weather, they may want to breastfeed more than usual. If you’re bottle feeding, as well as their usual milk feeds, the NHS recommends giving your baby a little cooled boiled water.

### In the winter, my home is below the recommended room temperature for babies. Should I keep the heating on all night?

It’s rarely necessary to keep your heating on all night, and adding an extra layer will usually help if you are struggling to keep the room warm.

Remember not to put a hat on your baby when they are indoors as babies maintain their body temperature by releasing heat through their head. Wearing a hat can mean they get too hot. Ensure your baby’s cot or Moses basket isn’t placed near a heat source, such as a radiator, heater or in direct sunlight. If you do feel your home is too cold and you want to leave the heating on all night, make sure it is set at a low temperature, and certainly no higher than 20°C.

## What should I do if my baby has a high temperature?

When babies feel unwell with a cold or have a high temperature (fever), they may be warmer than usual. Your baby should be dressed for their environment – it's important not to feel tempted to wrap an unwell baby up more than usual.

If your baby has a fever or you are worried about them, you should call your GP or 111. You should always seek medical advice for a temperature of 38 degrees or more in a baby under 3 months old. If your baby shows signs of being significantly unwell, always seek medical advice. The NHS has more information: [High temperature \(fever\) in children](#). You may also find it helpful to use our Baby Check app to monitor your baby's symptoms.

## What is the key takeaway for families?

Research shows that babies can't regulate their body temperature as well as adults can. If they get too hot, such as by overheating the room in winter, their risk of SIDS can increase.

