

Smoke + hot temperatures = increased SIDS risk

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Researchers are a step closer to understanding why cigarette smoke exposure during pregnancy may increase the risk of sudden infant death syndrome (SIDS). SIDS is the unexplained, sudden death of a child younger than one year of age. A new study finds that prenatal cigarette smoke exposure in rats affected breathing responses and immune function of their offspring. Breathing and immune response are made worse by high environmental temperature. The paper is published in the *American Journal of Physiology—Regulatory, Integrative and Comparative Physiology*.

Previous studies have shown that babies born to mothers who smoke during pregnancy are more likely to develop infection. Studies also suggest that [cigarette smoke](#) exposure may suppress [immune function](#) in an infant, which increases the risk of SIDS. Researchers from the University of Calgary in Canada studied rat pups that were exposed to cigarette smoke in the womb and compared them to a control group. Both groups were exposed to infection-causing bacteria, high ambient temperatures (to simulate heat stress) and low-oxygen environments.

"All possible interactions between the four factors were then studied," the researchers wrote. The smoke-exposure group was found to have:

- more episodes of apneas (temporary interruption of breathing),
- higher rate of cytokines production during an infection challenge. Cytokines are small protein particles which act as messengers from the immune system.

- faster heart rate at warmer temperatures in rats with bacterial infection, and more inflammation-signaling proteins.

The researchers explained that in addition to the negative findings in the [smoke-exposure](#) group, "high body temperature and infection suppressed the heart rate response normally seen during low oxygen environment."

"Thus, while most [environmental risk factors](#) increase the burden on the cardiorespiratory system in early life, hyperthermia and infection blunt the normal [[heart rate](#)] response to hypoxia, and gestational [cigarette smoke] independently destabilizes breathing by increasing apneas," the researchers wrote. They suggest that human responses may be similar to those of the rats, and may play a role in how we care for our children. "Our observations emphasize the importance of minimizing risk factors for cardiorespiratory instability in infants including safe sleeping environment, avoidance of high microenvironment and body temperature, and maternal [cigarette smoke] exposure."

More information: Fiona Brigid McDonald et al. Interactive Effects of Maternal Cigarette Smoke, Heat Stress, Hypoxia and Lipopolysaccharide (LPS) on Neonatal Cardiorespiratory and Cytokine Responses, *American Journal of Physiology - Regulatory, Integrative and Comparative Physiology* (2016). [DOI: 10.1152/ajpregu.00062.2016](https://doi.org/10.1152/ajpregu.00062.2016)

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