

# Blood pressure control abnormal in newborns of smoking mothers

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Newborns of women who smoked during pregnancy show signs of circulatory dysfunction in the first few weeks of life that get worse throughout the first year, Swedish researchers reported in *Hypertension: Journal of the American Heart Association*.

The [blood pressure](#) response to tilting the infants upright during sleep — a test of how the body copes with repositioning — was dramatically different in infants born to smoking mothers compared to those born to nonsmoking parents.

Infants not exposed to tobacco experienced only a 2 percent increase in blood pressure when they were tilted upright at one week of age and later a 10 percent increase in blood pressure at one year. Infants of smoking mothers had the reverse — a 10 percent increase in blood pressure during a tilt at one week and only a 4 percent increase at one year. At three months and one year, the heart rate response to tilting in the tobacco-exposed infants was abnormal and highly exaggerated, researchers reported.

"Babies of smokers have evidence of persistent problems in [blood pressure regulation](#) that start at birth and get worse over time," said Gary Cohen, Ph.D., lead author of the study and senior research scientist in the Department of Women and Child Health at the Karolinska Institute in Stockholm, Sweden. "This study reveals for the first time that early life exposure to tobacco can lead to long-lasting reprogramming of infant blood pressure control mechanisms."

The study included 19 infants of nonsmoking couples and 17 infants of women who smoked on average 15 cigarettes a day. Infants were normal weight at birth and breast fed. All infants had blood pressure and heart rates taken while sleeping and tilted up at a 60 degree angle during the first weeks, at three months and one year. They were then lowered back to the supine position.

Researchers also found:

- When tobacco-exposed babies were tilted semi-upright at one week, the rise in blood pressure was double that of controls, but at one year it had fallen dramatically and was only half that of age-matched controls.
- Reversing the posture from upright to horizontal — similar to suddenly lying down — normally causes blood pressure to fall back to normal; however, in infants of smokers the maneuver resulted in a surge in blood pressure.
- When infants were sleeping undisturbed, diastolic blood pressure in the smoke-exposed infants was higher at three months and their heart rate was slower by 20 percent at one year than in infants born to nonsmoking parents.

Normally, when a person stands, the [heart rate](#) increases and the blood vessels constrict to keep blood flow to the heart and brain.

"Infants of smokers have a hyper-reactive system in the first weeks of life because the blood pressure increases too much when they are tilted up, but at one year they under-react and are less effective in adapting to an upright position," Cohen said.

"Tobacco-exposed [infants](#) have a different profile," Cohen said. "It's surprising how early in life these functional abnormalities can be detected in the babies of smokers. The re-programming of the cardiovascular function is present at birth and is still present and even more dramatic at one year."

The researchers plan to continue to follow these children further to determine whether this re-programming creates problems when they become older.

"The seeds of many diseases probably are sown very early in life," Cohen said. "Babies of smokers may already be showing signs that they are more likely to develop high blood pressure later in life."

Identifying early markers could have broad public health implications — possibly leading to diagnosing, treating and preventing cardiovascular disease earlier, he said.

Provided by American Heart Association

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