

# Stress during pregnancy may increase offspring's risk of asthma

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Stress during pregnancy may raise the risk of asthma in offspring, according to researchers at Brigham and Women's Hospital and Harvard Medical School in Boston. The researchers investigated differences in immune function markers in cord blood between infants born to mothers in high stress environments and those born to mothers with lower stress and found marked differences in patterns that may be associated with asthma risk later in life.

"This is the first study in humans to show that increased stress experienced during pregnancy in these urban, largely [minority women](#), is associated with different patterns of cord blood cytokine production to various environmental stimuli, relative to babies born to lower-stressed mothers," said Rosalind Wright, M.D., M.P.H., associate physician at Brigham and Women's Hospital.

The findings have been published online ahead of print publication in the American Thoracic Society's [American Journal of Respiratory and Critical Care Medicine](#).

Asthma is known to be more prevalent among ethnic minorities and among disadvantaged urban communities, but the disparity is not completely explained by known physical factors. Urban women living in the inner-city also experience significant stress, particularly minority women.

The role of stress in asthma development is poorly understood, but

animal studies have suggested that the mother's stress during pregnancy can influence the offspring's [immune system](#), starting in the womb.

To determine whether a similar transference of stress-mediated immune differences may occur with humans, Dr. Wright and colleagues recruited pregnant women in several cities, including Boston, Baltimore, New York and St. Louis. Their families were largely ethnic minorities, 20 percent of whom were living below the poverty level. Each child's mother or a father had a history of asthma or allergy.

In total, 557 families answered detailed questions about the various stressors in their lives, at home (including [domestic violence](#)), in their financial situations and in their neighborhoods (community violence). When the infants were born, their cord blood was collected and isolated immune cells were stimulated with a number of factors (allergens like dust and cockroach, viral and bacterial stimulants), then analyzed for the production of various cytokines as indicators of how the child's immune system was primed to respond to the environment.

The researchers found that the patterns of cytokines related to certain stimulants differed based on the level of stress mothers reported.

"The cytokine patterns seen in the higher stress groups, which are an indication of how the child's immune system is functioning at birth, may be a marker of increased risk for developing asthma and allergy as they get older," explained Dr. Wright.

"For example, while the debate continues as to whether primary sensitization to allergens begins before birth, these findings suggest the possibility that prenatal stress may enhance the neonates' response to inhaled antigens, specifically those antigens that the fetus is likely to encounter more directly in utero, like dust mite."

The research, a prospective cohort study funded by the National Institute of Allergy and Infectious Diseases, will continue as the infants grow up to determine whether maternal stress levels do indeed have an impact on asthma development.

"The current findings suggest that psychological [stress](#) is involved in programming of the infant immune response and that this influence begins during pregnancy," said Dr. Wright. "As these infants mature, we will learn how these factors manifest later in terms of the development of [asthma](#) and allergy."

Provided by American Thoracic Society

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