

# URI nursing study finds effects of premature birth can reach into adulthood

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In the longest running U.S. study of premature infants who are now 23 years old, University of Rhode Island Professor of Nursing Mary C. Sullivan has found that premature infants are less healthy, have more social and school struggles and face a greater risk of heart-health problems in adulthood.

Sullivan has also found that supportive, loving parents and nurturing school environments can mitigate the effects of [premature birth](#). She also found that [premature babies](#) are resilient and have a strong drive to succeed.

A research scientist at Women and Infants Hospital and an adjunct professor of pediatrics at the Alpert Medical School at Brown University, Sullivan has been studying a cohort of babies born prematurely at Women and Infants Hospital in the 1980s for 21 years. Since the lead study was launched by Brown University, the research has attracted a total of \$7 million in federal grants. The study subjects are now 23 years old.

The latest investigation, funded by a \$2.4 million National Institutes of Health grant to URI, is examining whether stresses experienced by pre-term babies lead to illnesses when they are adults.

In March, Sullivan presented her early findings at the Eastern Nursing Research Society in Philadelphia. Sullivan's co-investigator, cardiologist Jim Zeigler, will present their findings at the 27th Congress meeting of

the European Group of Pediatric Work Physiology at Britain's University of Exeter Sept. 19 - 23.

Her latest work is based on the "fetal origins hypothesis," which states that the [stress response](#) of pre-term infants, called the hypothalamic-pituitary adrenal (HPA) axis, is a mechanism underlying fetal origins of adult chronic diseases.

Pre-term birth sets up a stress response, which produces higher levels of the [hormone cortisol](#), which is essential for regulating metabolism, immune response, vascular tone and homeostasis, Sullivan said. Her research is comparing [cortisol levels](#) in the adults who were born pre-term versus those born full-term and is assessing if cortisol levels among adults who were the sickest as premature infants are higher than those less medically and neurologically compromised.

Very low birth weight, repeated blood draws, surgery and breathing issues are among the major factors in stress levels for pre-term infants.

Among the early findings are:

- Male gender and birth weight affect early adult pulmonary function.
- The poorest pulmonary outcomes and higher resting blood pressure were for those born at extremely low birth weight.
- Additional health data for age 23 years has not been analyzed yet, but data from age 17 revealed that physical health, growth, and subtle neurological outcomes were poorer in the preterm groups.
- Infants with medical and neurological impacts had a 24 to 32

percent increase in acute and chronic health conditions.

- Continued monitoring of adults born prematurely is warranted, not only during young adulthood but as they reach middle age.

Sullivan said one approach her team will undertake will be Pathobiological Determinants of Atherosclerosis in Youth (PDAY) Risk Score at age 23 because it is strongly associated with coronary artery disease 10 to 15 years later.

"Continued monitoring of preterm survivors will enhance our understanding of the relative impact of prematurity and neonatal intensive care on later adult cardiopulmonary disease," Sullivan said.

"Since the beginning of the study, we have been asking the questions, can babies self-right themselves and do they have a resiliency that helps them overcome the challenges of pre-term birth?" Sullivan said. "Are there protective factors in the environment that mitigate the effects?"

Pre-term birth also affects even those infants not medically and neurologically ill in the following ways:

- Effects of pre-term birth do not disappear after age 2 or even after pre-term children catch up physically with full-term babies.
- Learning disabilities and other functioning issues often do not appear in premature babies until second grade and middle school years.
- Pre-term infants with no medical conditions have more learning disabilities, struggles with mathematics and need more school services than full-term babies. One of Sullivan's studies

determined that at least one-third of babies born pre-term needed school services at some point during their education. Out of that group, 22 percent of the healthy pre-term babies received school services. Almost one quarter of this group had an Individualized Education Plan (special education plan governed by federal and state law), with 15 percent receiving resources, 7 percent in self-contained classroom settings, and 11 percent receiving speech and language services.

- Some children of pre-term birth are less coordinated, which may be related to brain development and effects of neonatal intensive care.
- They have fewer friends and boys have more difficulty in school.

On the positive side, Sullivan found:

- Children who were born pre-term have a persistent drive to succeed.
- Children whose mothers provided a nurturing environment and who were strong advocates for them in school performed better academically, socially and physically. These are called protective factors and they work to counter the effects of pre-term birth.

"These findings are important for parents, nurses in the neo-natal intensive care units, teachers and staff in the schools, disability services offices in colleges and primary care providers," Sullivan said. "By identifying the issues pre-term babies face in childhood, adolescence and through adulthood, we can all be better prepared to take steps to mitigate their effects."

Provided by University of Rhode Island

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