

# MSA NEWSLINE

*Up-to-date Information on Maternal Substance Abuse and Child Development*

## Long-term Prenatal Alcohol Effects

### Long-term Executive Function Deficits of Moderate Prenatal Alcohol Exposure

Previous research has indicated that executive function may be compromised in children heavily exposed to prenatal alcohol, but what are the long-term effects of moderate exposure? A study by the Maternal Health Practices and Child Development Project assessed mothers during each trimester of pregnancy and with their children at birth, eight, and 18 months, and three, six, 10, and 14 years. The children were evaluated at each stage for their growth, development, and cognitive and psychological functions.

To test the longer-term effects of prenatal alcohol exposure, executive function was evaluated at the adolescent stage of 14 years, according to the following domains: planning, cognitive flexibility, concept formation and reasoning. To measure each of the executive function sub-domains, neuropsychological tests were administered including Children's Category Test and Trail Making Test. Also included were the WISC III subtests Mazes, Picture arrangement, Coding, Similarities, and Block Design.

### From Birth to Adolescence: Long-Term Effects of Alcohol Exposure

Although Fetal Alcohol Syndrome (FAS) was first described in the United States in 1973 by Jones and Smith, prevention efforts have not been very effective in lowering the number of births affected by exposure to alcohol in pregnancy. In addition, most children effected by alcohol are not identified during infancy although early identification would allow treatment of both mothers and infants. Many health care professionals believe that fetal alcohol effects cannot be seen in newborn infants and that children must wait until the preschool period for treatment. Because the Emory Maternal Substance Abuse and Child Development Program has followed a cohort of children from birth to 15 years, we were able to test several questions about diagnosis of alcohol effects in the newborn nursery. The questions that we examined were: 1) Are there signs in newborns that indicate that they have been affected by alcohol exposure? 2) Is there any relationship between these signs and development in adolescence? 3) Could these signs be used for early identification of children needing services?

One hundred and ninety one babies were seen from 1980 to 1986 at Grady Memorial Hospital in Atlanta, Georgia, and the same children were seen again when they were 14 to 15 years old. About one third of these children were not exposed to alcohol because their mothers did not drink. The rest had mothers who drank at least two drinks a week during pregnancy with an average of 20 drinks a week. After the babies were born, we collected information on growth (birthweight, head circumference), facial features associated with FAS, and behavior on the Brazelton Neonatal Assessment Scale (BNBAS; Brazelton, 1984). The BNBAS gives information about paying attention, motor ability, state control, and reflexes. In teenagers we also looked at growth (height, weight, head circumference) and facial features. In addition we looked at IQ, school performance and attention.

Right after birth, alcohol-exposed children weighed less than non-exposed babies and were less able to pay attention to adults. They also had more difficulty with state control and had less mature motor skills. When these children were teens we did not see differences in growth, although facial features associated with FAS were still visible. However, alcohol-affected children had lower IQs than other teens and were less able to maintain attention in a computerized task. They also had more difficulty with math at school than the other adolescents.

The results were that first trimester alcohol exposure predicted poorer performance on the Children's Category test, Mazes, and Trail Making tests, suggesting deficits in all domains of executive function. In addition, second trimester alcohol exposure was associated with a decrease in performance on Block Design, a measure of concept formation. The conclusion of this study was that moderate prenatal alcohol exposure did indeed lead to long-term deficits in executive function in adolescents, with the severity of these effects being dependent on the trimester of exposure.

-From presentation by Jennifer Anne Willford, Ph.D. at WPIC Research Day, 2001

When we used a number of the newborn signs, birthweight, physical features and behavior on the BNBAS to predict development 15 years later, we found the following: physical factors associated with alcohol exposure as well as the babies' newborn behavior was significantly related to IQ scores, particularly nonverbal and speeded tests, to school achievement and to the ability to sustain attention.

While many other influences, particularly the caregiving environment, are very important in long-term development, these findings suggest that it would be possible to identify the most affected children before they leave the newborn nursery and to refer them for early intervention to prevent or reduce the long-term negative outcomes of prenatal alcohol exposure. The infant, the family and society in general would benefit from such interventions.

(If you are interested in knowing more about this study, see [Alcoholism: Clinical and Experimental Research Vol. 27](#), February 2003. The article is called, "Neurobehavioral Consequences of Prenatal Alcohol Exposure: An International Perspective" and the authors are Riley, Mattson, Li, Jacobson, Coles, Kodituwakku, Adnams, and Korkman, pp 362- 373.)

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