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Premature Births May be Linked to Seasonal Levels of Pesticides and Nitrates in Surface Water

INDIANAPOLIS — The growing premature birth rate in the United States appears to be strongly associated with increased use of pesticides and nitrates, according to work conducted by Paul Winchester, M.D., professor of clinical pediatrics at the Indiana University School of Medicine. He reports his findings May 7 at the Pediatric Academic Societies' annual meeting, a combined gathering of the American Pediatric Society, the Society for Pediatric Research, the Ambulatory Pediatric Association and the American Academy of Pediatrics.

Dr. Winchester and colleagues found that preterm birth rates peaked when pesticides and nitrates measurements in surface water were highest (April-July) and were lowest when nitrates and pesticides were lowest (Aug.-Sept.).

More than 27 million U.S. live births were studied from 1996-2002. Preterm births varied from a high of 12.03% in June to a low of 10.44% in September. The highest rate of prematurity occurred in May-June (11.91%) and the lowest for Aug-Sept (10.79%) regardless of maternal age, race, education, marital status, alcohol or cigarette use, or whether the mother was an urban, suburban or rural resident. Pesticide and nitrate levels in surface water were also highest in May-June and lowest in August –September, according to the U.S. Geological Survey.

For the past four years, Dr. Winchester and colleagues have focused attention on the outcomes of pregnancy in Indiana and the United States in relation to environmental pesticides and nitrates in surface and drinking water. Last year at the Pediatric Academic Societies' annual meeting, Dr. Winchester reported that birth defects peak in Indiana and in the United States as a whole during April through July, the same months as pesticides and nitrates reach their maximum concentrations in surface water. This year's presentation expands upon that work.

"A growing body of evidence suggests that the consequence of prenatal exposure to pesticides and nitrates as well as to other environmental contaminants is detrimental to many outcomes of pregnancy. As a neonatologist, I am seeing a growing number of birth defects and preterm births, and I think we need to face up to environmental causes," said Dr. Winchester, who is also director of Newborn Intensive Care Services at St. Francis Hospital in Indianapolis.

"Preterm births in the United States vary month to month in a recurrent and seasonal manner. Pesticides and nitrates similarly vary seasonally in surface water throughout the U.S. Nitrates and pesticides can disrupt endocrine hormones and nitric oxide pathways in the developing fetus," he said.

"I believe this work may lay the foundation for some of the most important basic and clinical research and public health initiatives of our time. To recognize that what we put into our environment has potential pandemic effects on pregnancy outcome and possibly on child development is a momentous observation, which hopefully will help transform the way humanity cares for its world," said James Lemons, M.D., Hugh McK. Landon Professor of Pediatrics at the IU School of Medicine. Dr. Lemons is director of the section of neonatal-perinatal medicine at the IU School of Medicine and heads the Riley Hospital for Children of Clarian Health's section of neonatal-perinatal medicine.

Collaborating with Dr. Winchester on this study were Akosua Boadiwaa Adu-Boahene and Sarah L. Kosten of the IU School of Medicine, Alex K. Williamson of the U.S. Geological Survey, and Ying Jun, Ph.D. of the University of Cincinnati. The work was funded by the Division of Neonatology, Department of Pediatrics of the Indiana University School of Medicine.