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LATENT REPRODUCTIVE AND IMMUNOLOGICAL EFFECTS OF GESTATIONAL EXPOSURE TO HEPTACHLOR

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Introduction/Aim:

The aim is to determine whether gestational exposure to the chlorinated cyclodiene pesticide, heptachlor, results in latent effects on reproductive or immunological function. The study is based on a well characterized episode in which the commercial milk supply on the Hawaiian island of Oahu was contaminated with heptachlor epoxide (HE) during a 15 month period (1981–82), resulting in gestational exposure to offspring of women who drank cows' milk during that period. Previous research in Hawaii verified that HE concentrations in human serum and breast milk were significantly higher in the Oahu population than in the unexposed Neighbour islands' population following the period of milk contamination. Studies also demonstrated a significant association between HE concentrations and reported cows' milk consumption during 1981–82. A study conducted from 1999–2003 of 1,891 young adults who were born during 1981–82 and lived on Oahu, found that mothers' reported cows milk consumption during pregnancy was associated with lower neurobehavioural performance, and more reported behavioural problems in the young adults who were born on Oahu during the milk contamination.

Methods:

The current study follows up the young adults who participated in the earlier neurobehavioural study, to recruit 400 Oahu-born young adults and 200 comparison participants who were not born on Oahu, matched by age and ethnicity. Indicators of reproductive function include: serum testosterone in males, estradiol and progesterone in females; and LH and FSH in both sexes; semen samples; and daily first morning urine specimens in females for one menstrual cycle to measure LH, estrone-3-glucuronide, and pregnanediol 3-alpha-glucuronide. Indicators of immune function include skin tests for recall antigens; antibody titer response to immunization with tetanus and pneumococcal vaccine; and Th1 and Th2 type CD4+ cell subsets in blood.

Results:

The study has completed follow-up of the sampling frame and enrolled 250 participants, including 238 participants with substantially complete data collection. Of these, 209 were born on Oahu and 29 were born elsewhere. Initial analysis of the reproductive and immune function parameters has indicated no clear associations with place of birth or, among Oahu-born participants, mothers' reported cows' milk consumption during pregnancy. Findings on approximately 375 participants will be completed by Summer 2005.

Conclusion:

The findings indicate that gestational exposure to HE may be associated with subtle latent effects on neurobehavioural performance, although there is no apparent effect on reproductive or immune function, based on the initial analysis. Data collection prior to the ISEE conference will achieve sufficient statistical power to address the hypotheses. This study is funded by the US Environmental Protection Agency.