

DOES REGULAR MULTIVITAMIN/MINERAL SUPPLEMENTATION MODIFY THE RELATION BETWEEN MATERNAL SMOKING AND FETAL DEATH? T. Wu,\* G. Buck, P. Mendola (State University of New York at Buffalo, Buffalo, NY 14214).

Data from the 1988 National Maternal and Infant Health Survey (NMIHS) were used to examine whether regular multivitamin/mineral supplementation could reduce the elevated risk for fetal death that is associated with maternal smoking. Women who reported using multivitamin/mineral supplements at least three days a week during the three months before and/or after recognition of pregnancy were defined as regular multivitamin/mineral supplement users. Cigarettes smoked during pregnancy was self-reported. The sample comprised 12,465 singletons including 9,402 live births and 3,063 fetal deaths. Re-scaled weights for the US 1988 vital events were applied for risk estimation. Odds ratios were derived from logistic regression analyses after adjusting for select demographic and reproductive variables. Relative excess risk due to interaction (RERI) was computed. Major findings include: (1) in the absence of regular multivitamin/mineral supplementation, odds ratios for fetal death associated with maternal smoking 1-9, 10-19, and 20 or more cigarettes a day as compared with non-smoking reflected a dose-response association; (2) no effect of regular multivitamin/mineral supplementation in the absence of maternal smoking was observed; (3) in general, odds ratios for smoking women who regularly used supplements as compared to women who neither smoked nor regularly used supplements were smaller than odds ratios for women who did not regularly use the supplements but smoked the corresponding number of cigarettes; and (4) point estimates of RERI were generally negative; a significant RERI was observed among women who regularly used the supplements before recognition of pregnancy and smoked 20 or more cigarettes a day suggestive of possible effect modification.

ALTERED THYROID HORMONES AND CYTOGENETIC PROFILES IN BACKPACK SPRAYERS USING ETHYLENE BISDITHIOCARBAMATE (EBDC) FUNGICIDES IN MEXICO. K. Steenland,\* L. Cedillo, J. Tucker, C. Hines, K. Sorensen, J. Deddens, V. Cruz (National Institute for Occupational Safety and Health (NIOSH), Cincinnati, OH 46226).

EBDC (ethylenebisdithiocarbamate) fungicides are used heavily in the U.S. EBDCs are metabolized to ethylene thiourea (ETU). The US EPA classifies ETU as a carcinogen based on animal data, and has restricted their use. There are no data on the potential carcinogenicity of EBDCs in humans, and only one study on human genotoxicity. ETU causes alters thyroid hormones in rodents, decreasing T4 and increasing TSH. The authors have studied cytogenetic outcomes and thyroid hormone levels among 49 heavily exposed workers spraying EBDC on tomatoes in Mexico, along with 14 lightly exposed land owners and 31 nonexposed controls. Urinary ETU was used to compare exposure between groups. The authors found an increase in TSH ( $p=0.2$ ) among applicators compared to controls, but no decrease in T4. The authors found increases in sister chromatid exchange ( $p=0.2$ ) and in all chromosomal translocations ( $p=0.5$ ) for applicators compared to controls; however, the subset of reciprocal translocations showed a lesser increase ( $p=0.4$ ). Translocations are chromosomal aberrations which persist through cell division; they are elevated in tumors, often occurring at sites of genes affecting cell cycle and tumor suppression. These data suggest that EBDCs are affecting the thyroid and the lymphocyte genome among heavily exposed workers.

CANCER MORTALITY AMONG PLUTONIUM AND RADIATION WORKERS. G.S. Wilkinson,\* J. Baillargeon, L. Ray, G. Baillargeon, J. Trieff (University of Texas Medical Branch, Galveston, TX 77555).

A previous study of nuclear workers at the Rocky Flats Plant reported increased relative risks for Lymphatic and Hematopoietic (LH) Cancers (CA) among workers with plutonium (PU) body burdens  $74$  becquerels (Bq), but not for workers with cumulative external radiation doses  $1$  centisievert (cSv). With an additional 10 years of follow-up, mortality among white male workers, who worked at least 2 years and who were monitored for Pu or external radiation was investigated. A Cox regression procedure was employed to adjust relative risk (RR) estimates for year of birth, year at hire, calendar year, length of follow-up and 10 years of induction time. RR estimates and 90% confidence intervals (CI) for LH CA are 1.9 (0.8-4.4), 2.0 (0.8-4.6), 2.3 (1.0-5.3) for those with PU body burdens of 74, 112, and 370 BQ. Among those with cumulative external radiation doses  $1$ ,  $2$ , and 10 cSv, RR estimates of 1.0 (0.4-2.3), 2.0 (0.8-5.0) and 3.1 (1.2-8.2) were observed. No increased RR estimates are observed for radiation sensitive solid tumors combined, with the exception of those with cumulative dose  $10$  cSv (RR=1.5, 90%CI=1.0-2.4). These results tend to replicate previous findings for LH CA associated with PU exposures. Increased risk estimates for LH CA and radiation sensitive CA associated with penetrating radiation doses were not previously observed.

MAGNETIC FIELD EXPOSURE AND NEURODEGENERATIVE DISEASE MORTALITY AMONG ELECTRIC UTILITY WORKERS. D. Savitz,\* H. Checkoway, D. Loomis (University of North Carolina, Chapel Hill, NC 27599).

Recent reports have raised concern regarding occupational magnetic fields and neurodegenerative diseases. The authors examined this issue using data from a study of magnetic fields and cancer among 139,905 workers employed 1950-1986 at five electric utility companies. Magnetic field exposures were assigned for occupational groups based on measurements and to individuals based on job histories. Poisson regression was used to analyze the association between duration of work in jobs with magnetic field exposure and cumulative exposure and neurodegenerative disease mortality both as underlying ( $N=97$ ) and mentioned cause of death ( $N=206$ ). Adjustments were made for age, race, calendar year, solvent and PCB exposure, social class, and work status. Duration of work in exposed jobs was not associated with Parkinson's disease, inconsistently associated with Alzheimer's disease, but was positively associated with amyotrophic lateral sclerosis (ALS) (rate ratio (RR) =2.0, 95% confidence interval (CI) = 0.7-6.0 for 5-20 years employment and RR of 3.1, 95% CI = 1.0-9.8, for 20+ years employment). Similarly, estimated magnetic field exposure was unrelated to Parkinson's disease, weakly related to Alzheimer's disease, and more strongly related to ALS, particularly with a latency of 20 years (RR=2.3, 95% CI = 0.8-6.6, and RR = 3.0, 95% CI = 1.0-9.2 for exposures of at the 30-50th and >50th percentile versus less than the 30th percentile). Despite limitations in the quality of diagnoses and imprecision, these results suggest an association between magnetic fields and ALS.

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Journal of

ISSN 0002-9262  
Printed in the U.S.A.

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# EPIDEMIOLOGY

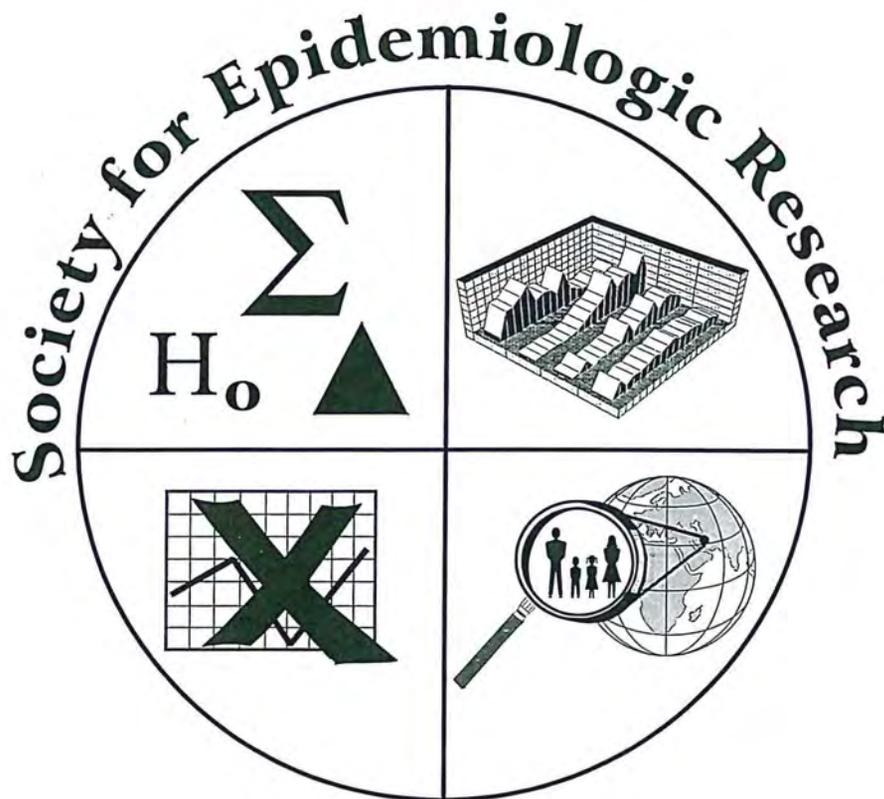
Volume 145

Number 11

June 1, 1997

Published by The Johns Hopkins University  
School of Hygiene and Public Health

Sponsored by the Society for Epidemiologic Research



**ABSTRACTS OF THE 30TH ANNUAL MEETING  
EDMONTON, ALBERTA, CANADA, JUNE 12-14, 1997**