

# 10144-INCIDENCE RATES OF *CHLAMYDIA TRACHOMATIS* INFECTIONS AND PARAMETERS OF FEMALE REPRODUCTIVE HEALTH IN NOVOSIBIRSK, RUSSIA (1995-2000)

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**Background:** *Chlamydia trachomatis* (CT) infections is the most common cause of pelvic inflammatory disease (PID) in industrialised countries, and is an important cause of female and male infertility world-wide. Genital infections caused by CT initiate and maintain the inflammatory process but are generally asymptomatic. Immunopathological pathways associated with genital CT infections include tubal infertility, ectopic pregnancy, pelvic adhesions, chronic endometritis and salpingitis, epididymitis and a persistent carrier state.

**Objective:** To document trends of CT infections recorded in Novosibirsk (Western Siberia) in 1996-2000.

**Methods:** Incidence rates of CT infections for the period 1996–2000 were investigated. The data from all district STD clinics were obtained and registered in the Department of Social Statistics of the Regional Committee of Statistics of Novosibirsk. The tests available for detection of CT are PCR (polymerase chain reaction) and DIF (direct immunofluorescent assays).

**Results:** Novosibirsk is a largest city of Siberia and the third one in Russia with population about 1.5 million. There are 405,940 women at the reproductive age. The number of the population was constant in the recent years. Various parameters of female reproductive health in Novosibirsk are shown in Table.

Table. Live birth, Premature birth, Ectopic pregnancy, Abortions, and Pelvic Inflammatory Disease (PID) rates in Novosibirsk (per thousand females reproductive age)

	1995	1996	1997	1998	1999	2000
<b>Live births</b>	19.1	18.3	21.8	20.7	24.2	25.6
<b>Premature births</b>	0.7	0.6	0.6	0.7	2.0	1.8
<b>Ectopic pregnancy</b>	1.3	1.2	1.4	1.5	1.4	1.6
<b>PID</b>	18.2	10.2	9.8	11.1	7.7	8.1
<b>Abortions</b>	65.4	67.9	63.7	65.9	68.1	69.4

Incidence rates of CT infections were calculated and expressed per 100.000 population. The data for the entire population of Novosibirsk were as follows: **1996** - 241.0; **1997** - 396.4; **1998** - 385.4; **1999** - 317.2; **2000** - 342.1. The incidence rates were 2-3 times higher in females than in males during 1996-2000. The rates were relatively constant through 1996 to 2000.

**Conclusions:** CT infections are widespread among the general population of Novosibirsk. These trends are similar to those in other regions of Russia, and higher than in Western European countries. This problem may threaten public health and demographic situation in Russia that needs improving of hygiene standards and sex education among the population. The state program is needed for prevention of CT infections among risk groups.

## **10237-Physical abuse during pregnancy among rural population and urban slum dwellers in Bangladesh: prevalence and risk factors**

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**Background:** Violence during pregnancy is an unrecognised health and social problem in Bangladesh. This family violence poses particular risks to the women and her fetus. Studies have shown that physical abuse during pregnancy increases the risk of miscarriage, abruptio placentae, preterm labour and delivery. This is an important cause of high maternal mortality in Bangladesh. But, magnitude and risk groups of this problem are yet to be explored in this country. For preventive and control of this physical abuse during pregnancy, it is important for the policy makers, and obstetricians to be aware of the extent of the problem.

**Objectives:** This study has been conducted to estimate the prevalence of physical abuse during pregnancy among rural population and urban slum dwellers. This study was also aimed to explore the factors associated with the physical abuse during pregnancy.

**Methods:** 750 pregnant women of 12 to 20 weeks of gestation from rural population and 250 same category women from slum dwellers of Dhaka city were recruited for the study. Multistage luster sampling method were applied during selection of study subjects. The recruited pregnant women were interviewed thrice- one during recruitment, another after 12 weeks of recruitment and finally at term to record any physical abuses during their pregnancy period. In rural area female health and family welfare workers and at urban area female university graduates were extensively trained and involved in data collection. Two structured pretested questionnaires were used to record information on socio-demographic characteristics of pregnant women and their husbands, and promoting, originating and facilitating factors of violence against women. The study has been conducted during July 2000 to June 2001.

**Results:** Of all 1000 recruited pregnant women, 876 were interviewed at term. The drop out rate was 12.4% which in rural area was 10.1% and in urban slum 19.2%. In all 876, 133 (15.2%) of women reported experiencing physical abuse during their current pregnancy. Of the 133 women 105 (78.9%) reported that the perpetrator was her husband. Dowry was the main reported cause of physical abuse. The illiterate women were at greater risk than literate women (OR 2.70; 95% CI 1.77-4.14). Women whose husbands had drinking habit were 2.85 times (95% CI 1.39-5.80) more likely to have been abused than women whose husbands did not have drinking habit. Women whose husbands received dowry were 1.5 times greater risk (95% CI 1.02-2.20) to be abused.

**Conclusion:** Physical abuse during pregnancy is a major public health problem in Bangladesh. Physical abuse affects significantly low socio-economic group of pregnant women. Dowry was the main cause of physical abuse during pregnancy in Bangladeshi women.

10277-Factors influencing transfer of lead from mother to child during pregnancy.

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Prenatal exposure to lead may put an infant at higher risk for deficits in neurobehavioral development or physical growth in later life. Although maternal blood and infant cord blood lead levels are highly correlated, some infants receive higher exposures relative to the mother's body burden than others. It is not clear what accounts for the variability in this transfer. 158 mother-infant pairs from a racially balanced cohort of women receiving prenatal care at Magee Women's Hospital in Pittsburgh, PA during 1992-5 were studied. Lead transfer was operationalized as the ratio of the maternal blood lead at delivery and the cord blood lead, the difference between the two, and a dichotomous variable (cord higher than maternal/not). Women were interviewed twice during the pregnancy about lifestyle, medical history, calcium nutrition, and exposure to lead. Medical records were abstracted for prenatal and labor/delivery history. Higher blood pressure, especially among women older than 29 or who gained more than 40 pounds during their pregnancy, was associated with greater mother-child differentials in lead levels. Alcohol use and sickle cell trait in the mother were also associated with greater lead transfer, while at least one previous miscarriage was associated with less transfer. No association was seen with race, parity, smoking, exertion, or calcium consumption, nor did they confound the sickle cell, miscarriage, and alcohol relationships. Higher blood pressure and alcohol consumption may result in increased transfer of lead to the fetus during pregnancy.

10511-LONGITUDINAL STUDY OF SEMEN QUALITY AFTER INTERMITTENT EXPOSURE TO AIR POLLUTION.

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A previous study of semen quality in men providing one sample each, showed significant associations between exposure to high levels of air pollution and adverse effects on sperm morphology and sperm chromatin structure. These positive findings prompted a followup study with a longitudinal design. Thirty-seven men from Teplice District, Czech Republic were surveyed on 7 occasions over 2 years time: during late summer when pollution was low and winter when pollution was high. Semen outcomes were analyzed for changes associated with levels of air pollution components (SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub> or PAH) or with season (late summer or winter) using a mixed model regression analysis (SAS) for repeated measures, and controlling for effect modifier and potential confounders. No significant associations were found between exposure and sperm concentration, percent motile sperm, or percent normal sperm heads. In contrast, the percent sperm with abnormal chromatin structure increased with exposure. Specifically, DNA Fragmentation Index (DFI), obtained using SCSA™, showed significant (p<0.05) positive associations with season of high air pollution ( $\beta=0.191$ , 95% CI: 0.018, 0.365), and with SO<sub>2</sub> levels ( $\beta=0.026$ , CI: 0.001, 0.053). Correlations between DFI and either PM<sub>10</sub> or PAH were of borderline significance (p<0.066 and p<0.059, respectively). These findings confirm our earlier results suggesting that intermittent exposures to high levels of air pollution may increase risks of infertility and male-mediated developmental toxicity.

The views expressed are those of the authors and do not necessarily reflect the views or policies of the U.S. Environmental Protection Agency.

## 10564-Antagonism of arsenic and iodine in pregnancy outcomes

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**Background.** Arsenic exposure, beside its carcinogenic effect, has been found to be associated with elevated risk of some adverse pregnancy outcomes as stillbirth and spontaneous abortion. In the early 1980-ies in South-East Hungary about 400,000 people were supplied with drinking water with high (>50 µg/l) arsenic level. In some parts of South-East Hungary the drinking water contains high level of iodine as well (while in most parts of the country the people need iodine completion). In a survey carried out in some selected settlements of that area significant increase in the incidence of stillbirth and spontaneous abortion could be found in the settlements supplied with drinking water with high arsenic content. Considering the known biological interactions between arsenic and iodine we re-evaluated the data on pregnancy outcomes of the formerly selected settlements, using the results of contemporary measurements of iodine content of the supplied drinking water.

**Methods.** 7 villages (with a total population of 25,000) and 2 towns (with 22,000 and 25,000 inhabitants, respectively) supplied with drinking water containing arsenic level above 100 µg/l were selected as exposed settlements and 6 villages (with a total population of 21,000) and one town (25,000 inhabitants) supplied with drinking water <10 µg/l were chosen as control ones. Archive data on the arsenic and iodine concentrations of the drinking water supplying the selected settlements before remediation were used as exposure indicators. Data on pregnancy outcomes between 1970 and 2001 were collected from the district nurses' registries. Linear regression models were used for statistical analysis.

**Results.** We found significant associations between arsenic level and spontaneous abortion ( $p= 0.0275$ ) or stillbirth ( $p= 0.0087$ ). However, when iodine content was also considered, spontaneous abortions showed significant association with the arsenic level only among those settlements ( $n=6$ ) where the iodine content was  $\leq 100 \mu\text{g/l}$  ( $p = 0.0354$ ). In settlements supplied with drinking water with higher iodine content this relationship could not be observed. The association between arsenic and stillbirth was significant only in settlement with drinking water with iodine content  $\leq 200 \mu\text{g/l}$  ( $p=0.0094$ ). At higher iodine content the association was absent.

**Conclusion.** Iodine may prevent arsenic-related adverse pregnancy outcomes as in some other health outcomes this has already been observed. The interaction between iodine and arsenic should be further investigated.

**10578-EPIDEMIOLOGIC ASSESSMENT OF THE ASSOCIATION BETWEEN AIR POLLUTION AND FETAL LATE LOSS CAUSES IN SÃO PAULO, BRAZIL.**

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The association between air pollution (NO<sub>2</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, and PM<sub>10</sub>) and daily counts of fetal mortality after 28 weeks of pregnancy was investigated in São Paulo during the period ranging from January 1998 to December 2000. The daily number of total deaths and two main causes, hypoxia and malformations, were used as dependent variables in generalized additive Poisson regression models. Non-parametric smooth functions (loess) were used to control seasonality, temperature and humidity. Fetal mortality was significantly associated with NO<sub>2</sub> (coefficient = 0,0007 µg/m<sup>3</sup>, p=0.02), and SO<sub>2</sub> (coefficient = 0,0047 µg/m<sup>3</sup>, p= 0,01). When analyses were stratified by cause of death, hypoxia was associated with NO<sub>2</sub> (coefficient = 0,0014 µg/m<sup>3</sup>, p=0,02), and O<sub>3</sub> (coefficient = 0,0018 µg/m<sup>3</sup>, p= 0,01). Fetal deaths counts caused by malformations did not exhibit a significant association with air pollution in terms of short time effects. Our findings reinforce the hypothesis that air pollution causes adverse acute health effects on fetuses. This abstract was funded by: LIM05-FMUSP, UNISA, and FAPESP.

10589-Poor birth outcomes in association with environmental factors in Bulgaria  
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To assess the relationship between environmental contamination and adverse birth outcomes, an ecological study encompassing a 15-year period (1980-95), was performed in 14 "hot spot" industrial areas in Bulgaria. General population exposure to environmental chemicals was assessed on the basis of the ambient levels in air, drinking water, and soil (data of the national monitoring system). Data on birth outcomes were derived from medical records at local clinics; all births registered in the studied areas during the observation period were taken into account (a total of 669 178 births). The outcomes measured were stillbirths, congenital anomalies, pre-term births, and early neonatal morbidity and mortality during the first week of life (total and cause-specific). The local rates of these outcomes were compared to the entire country rate. The relationship between exposures and outcomes was explored by correlation and regression analysis, taking into account other potential risk factors (e.g. ionizing radiation exposure, socioeconomic factors), or modifying factors, such as essential elements content in environmental media. Increased prevalence of poor birth outcomes and early neonatal morbidity was found in the polluted areas in comparison to the entire country rate. Specific outcomes (prematurity, early neonatal morbidity) were significantly associated with exposures to heavy metals, oxidized nitrogen, and volatile organic compounds. Increased irradiation levels after the Chernobyl accident in 1986, were associated with increased risk of early neonatal morbidity after controlling for environmental chemical contamination. Although both radiation and chemical exposures declined in the subsequent years, an increasing trend in poor birth outcomes persisted in the '90s, as illustrated by the increased rates of prematurity, congenital anomalies, and early neonatal morbidity. That period was characterized by a sharp decline in the gross national product and population income, suggesting that in the '90s, the role of environmental contamination as a perinatal health risk in the country shifted to socioeconomic factors.

Congenital Anomalies Associated with Land Use Patterns in Maryland

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Various birth defects have been reported to be increased in offspring of parents with occupational exposure to pesticides. These exposures have included agricultural spraying, manufacture, or other exposures. However, no systematic registry of birth defects has been investigated for association with environmental features including land use patterns or pesticide use. This study uses GIS to generate hypotheses about association of birthdefects with such environmental features.

Cases of liveborn infants with sentinel birth defects recorded in Maryland over the years 1984 through 1989 were contrasted with contemporaneously collected controls of liveborn infants. Two defects were excluded from analysis: congenital dislocated hip which showed ascertainment bias due to concentration in one county, and "other" which was thought to be poorly defined. Two counties were excluded because of ascertainment bias due to deliveries of women from those counties in an adjacent state. The following characteristics of cases and controls could be analyzed from the common dataset: birth date; mother's age, mother's total previous pregnancies, maternal insulin dependent diabetes, mother's smoking, mother's race, gestational age, birthweight. Addresses of mothers at the time of conception were used to locate mothers to census block groups. Geographic information system approach was used to incorporate data on water supply, aquifer, exposure to release of toxic chemicals, proximity to hazardous waste sites, land use patterns, and patterns of pesticide presence in ground or surface water into a common database.

Cleft lip is associated with maternal race. Anencephaly is associated with maternal age. Hypospadias is associated with residency in industrial zones, and with maternal age. Rectal and anal atresia showed no associations with the variables in this data set. Limb reduction anomalies of the upper or lower extremity, cleft palate, hydrocephalus, esophagheal atresia, and spina bifida are all associated with residency in regions of cropland. The association is strengthened by limiting cases and controls to those in which land use in the census block group is only cropland free of orchard or deciduous forest.

Examples of the multiple regression for cleft palate and for limb reduction of the lower extremities are in the table below.

Anomaly	Risk Factor	Beta	Exp Beta	95%CI
Cleft palate	Percent wells	2.016	7.509	1.74, 32.5
	Orchard	2.5225	12.46	1.25, 125.4
	Crop No Orchard	1.9001	6.69	1.75, 25.5
Limb Reduction LE	Maternal diabetes	1.7205	5.59	1.16, 26.95
	Cropland	1.0023	2.72	1.43, 5.19

Information on pesticides present in ground water and surface water is being assessed for possible association with specific birth defects.

## **10616-INFLUENCE OF BREASTFEEDING PRACTICES AND BONE LEAD BURDEN ON LEVELS OF LEAD IN BREAST MILK OVER THE COURSE OF LACTATION**

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Lactation has been identified as a powerful stimulus for bone resorption and mobilization of maternal bone mineral stores has been suggested as a potential source of lead exposure to the breastfeeding infant. Women with high bone lead levels and a high intensity of breastfeeding may mobilize more lead than those with lower lead burdens and less intensive breastfeeding practices. We studied a cohort of 617 women in Mexico City who participated in a randomized trial of calcium supplementation (1,200 mg/day) during lactation to evaluate the effect of cumulative lead exposure on changes in breast milk lead over the course of lactation. Umbilical cord and maternal blood samples were obtained at delivery. At one month postpartum, K-X-ray fluorescence measurements of bone lead were taken. Maternal blood and breast milk samples and questionnaire data were collected at one, four and seven months postpartum. Venous whole blood lead was analyzed using graphite furnace atomic absorption spectroscopy. Breast milk samples were collected and analyzed using methods to avoid environmental contamination. Sample digestion was carried out with HNO<sub>3</sub> in high temperature, high pressure-asher and lead content in the samples was analyzed by isotope dilution-inductively coupled plasma mass spectrometry. This analysis is limited to those 118 women with breast milk lead levels at each stage of the study (1, 4, 7 months postpartum). Breast milk lead concentrations [mean (SD), {range} ng/g] were: 1 month postpartum = 1.56 (1.36), {0.38-8.02}; 4 months postpartum = 1.22 (1.03), {0.20-6.76}; 7 months postpartum = 0.86 (0.56), {0.18-2.73} and showed a significantly decreasing trend over the course of lactation ( $p < 0.00001$ ). Blood lead levels [mean (SD), {range} mcg/dL] were: 1 month postpartum = 10.6 (4.8), {2.4-29.1}; 4 months postpartum = 8.7 (3.8), {2.1-23.2}; 7 months postpartum = 9.1 (4.2), {2.3-24.5} and also decreased significantly over the course of lactation ( $p = 0.02$ ). Breastfeeding patterns, calcium status, and maternal lead burden were analyzed as determinants of breast milk lead. The associations of bone lead and blood lead to breast milk lead were estimated by longitudinal statistical models using generalized estimating equations (GEE). Adjusting for age, parity, and numbers of months of previous lactation, the only significant predictors of changes in breast milk lead over the course of lactation were dietary calcium intake and time since delivery. Relationships of bone lead and blood to breast milk lead may be modified by levels of dietary calcium intake and supplementation.

## 10625-The Effect of Air Pollution on Low Birth Weight by Gestational Period in SEOUL

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In recent years, several studies reported an association between air pollution and low birth weight. However, the association of the timing of exposure to air pollution during pregnancy and birth weight has not been established. We evaluated the relation between low birth weight and air pollution exposure levels in Seoul, Korea. Birth data were collected from Korean National Birth Register from January 1, 1996 to December 31, 1998. Air pollution data obtained from the Department of the Environment was used to estimate the exposure during each trimester and each month of pregnancy on the basis of the gestational age and birth date of each newborn. Generalized additive logistic regression analyses were conducted considering trend, gestational age, maternal age, parental educational level, parity, and infant sex.

We found that the increased risk for low birth weight was associated with carbon monoxide (CO) in the first trimester and total suspended particles (TSP), sulfur dioxides (SO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>) in the second trimester and ozone (O<sub>3</sub>) in the third trimester. An increase of interquartile change in CO was associated with 3.9% increase in the risk of low birth weight (CI, 0.98-6.89%). The percent change of low birth weight was 5.2% (CI, 1.12-9.38%), 6.6% (CI, 2.31-11.05%) and 3.2% (CI, 0.95-5.52%) for interquartile change in TSP, SO<sub>2</sub> and NO<sub>2</sub>, respectively, in second trimester. For the third trimester, the percent change for O<sub>3</sub> was 6.6% (CI, 2.80-10.48%). We found dose-responsive effects of CO on low birth weight during the first trimester and TSP and SO<sub>2</sub> during the second trimester. We also found the RR tended to increase with the pregnancy month from two to five month for CO, four to five month for TSP, three to five month for SO<sub>2</sub>, NO<sub>2</sub> and seven to nine month for O<sub>3</sub>. Our results suggest each air

pollutant effects on low birth weight are different by the exposure period of pregnancy.

## 10633-Air pollution and low birth weight in six cities of Korea

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We examined the associations between air pollution exposures during pregnancy and low birth weight (LBW) in six cities of Korea for the period 1996-1998. We obtained daily data of air pollutants [carbon monoxide (CO), particulate matter less than 10  $\mu$ m in diameter (PM10), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>)] from the Department of Environment and birth data from the Korean National Birth Register for six cities (Seoul, Incheon, Taejeon, Taegu, Pusan, and Kwangju).

We performed two-stage analyses. First, for the individual city analysis, generalized additive logistic regression models, using a smoother to control for time trend patterns, were applied. We adjusted gestational age, maternal age, parental educational level, parity, and infant sex in the model. Second, we calculated the city-specific estimates for air pollution associated with LBW and computed overall estimates using fixed and random effect models.

The city-specific risks varied across cities. Furthermore, they showed that the heterogeneity found in the air pollutants among cities reflects effect modification, which is explained by specific city characteristics. Pooled effect during the first trimester showed air pollutants were significantly associated with LBW. Risk estimates were 1.037 (95% CI, 1.014-1.059) for CO, 1.046 (95% CI, 1.023-1.070) for PM10, 1.025 (95% CI, 1.004-1.046) for NO<sub>2</sub> and 1.032 (95% CI, 1.011-1.053) for SO<sub>2</sub>. By contrast, O<sub>3</sub> was significantly associated with LBW during third trimester (RR, 1.045; 95% CI, 1.022-1.068). Pooled analysis showed that most air pollutions were related to the risks of LBW during first trimester. Our results confirm those previously reported on the effects of ambient air pollutants on low birth weight.

10731-Maternal Consumption of Contaminated Sport Fish and Infant Gestation and Birth Size, New York State Angler Cohort Study

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The scientific literature poses a perplexing dilemma for pregnant women with respect to the consumption of sport fish from natural bodies of water. On one hand, fish is a good source of protein, low in fat and a rich source of other nutrients all of which have presumably beneficial effects on developing embryos and fetuses. In fact, pregnant women who consume large quantities of marine fish are reported to have prolonged gestations and larger infants than women consuming no or little fish. On the other hand, consumption of sport fish contaminated with environmental toxicants such as polychlorinated biphenyls (PCBs) has been associated with decrements in gestation and birth size in some studies. The New York State Angler Cohort Study (NYSACS) had as one of its primary research objectives a purposeful study aimed at addressing this issue. The study sample was restricted to the most recent live born singleton infant (n=2,716) born between 1986-1991 to female participants in the NYSACS. Hospital delivery records (maternal and newborn) were obtained for 93% of infants for the ascertainment of gestation (weeks), birth size (weight, length and head circumference) and other known and potential determinants of fetal growth (i.e., maternal parity, history of placental infarction, uterine bleeding, pregnancy loss or cigarette smoking and infant's race, sex and presence of birth defect). Duration of maternal fish consumption prior to the index infant's birth was categorized into tertiles: none; 1-2,3-7, 8+ years, while birth weight (in grams), birth length (in grams), and head circumference (in centimeters) were left as continuous variables in multiple linear regression models. Birth size variables were stratified by gestational age categorized as <37, 37-41 or 42+ weeks to assess for potential effect modification and confounding. Birth size percentiles, ponderal indices and head to chest circumference ratios were computed to aid in the interpretation of individual birth size measurements. ANOVA failed to identify any significant mean differences between gestation or birth size measures by duration of maternal fish consumption. Maternal fish consumption for  $\geq 8$  years was negatively ( $p < 0.04$ ) associated with a lower head circumference percentile after adjusting for the above covariates and gestational age left as a continuous variable in multiple linear regression analysis. However, no other significant associations were found for maternal fish consumption and gestation, birth weight or length, or summary measures. The results from this study are mixed – corroborating earlier reports of diminished head circumference while refuting others reporting reductions in gestation and birth weight. Continue efforts are needed to interpret the equivocal data to date regarding consumption of fish from polluted waters and any association with reproductive and developmental outcomes.

10786-Concentrations of Heavy Metals and Female Fecundity, New York State Angler Prospective Pregnancy Study.

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Select metals have been shown to be reproductive and developmental toxicants in animals and humans, but often at concentrations above background levels. Much of the available data for the impact of metals on human reproductive function stems from retrospective observational designs often without individual exposure data raising concerns about the interpretation of findings. The purpose of this study was to assess whether low concentrations of select metals in women's blood, typical of background environmental exposures, affect the fecundity of female members of the New York State Angler Cohort Study. Using a prospective cohort design, 90 (88%) women were enrolled into a prospective pregnancy study and followed up to 12 at risk menstrual cycles providing they met the following eligibility criteria: planning to discontinue birth control to become pregnant; aged 20-34 years; and free of known fecundity or fertility impairments. Registered nurses conducted baseline interviews in participants' homes where blood specimens were collected, and instructed women in the use of home pregnancy kits and in the completion of daily diaries (for collection of menses, sexual intercourse, pregnancy test results, and other select exposures). Eighty-one (90%) women provided blood specimens before trying to conceive and upon enrollment into the study and comprised the study sample. Concentrations of arsenic, cadmium, lead, nickel, magnesium, selenium, and zinc were determined by ICP-MS. After preparation of blood specimens, the samples were analyzed using external calibration and internal standardization procedures. The distribution of mean ( $\pm$ standard deviations) metal concentrations (in mg/L whole blood) were: arsenic ( $.005\pm.003$ ), cadmium ( $.008\pm.053$ ), magnesium ( $34.42\pm 2.84$ ), nickel ( $.007\pm .003$ ), lead ( $.017\pm.006$ ), selenium ( $.23\pm.04$ ), and zinc ( $4.98\pm.58$ ). A discrete-time analog of the Cox proportional hazards regression model was utilized to assess log transformed ( $\mu\text{g}/\text{dl}$ ) metal concentrations and female fecundability as measured by time-to-pregnancy (TTP) or the number of at risk menstrual cycles required for pregnancy. A separate model was run for each metal; subsequently, models were adjusted for all metals, age and select covariates (cigarette smoking; alcohol, caffeine and fish consumption; parity; pregnancy losses; and frequency of sexual intercourse). No significant associations were seen for any of the metals at these low concentrations and TTP. Future epidemiologic studies interested in assessing low concentrations of metals and sensitive reproductive outcomes will require relatively large samples of women with a range of exposures if a more definitive answer is to be reached.

## **10919-Air Pollution and Adverse Birth Outcomes in the South Coast Air Basin, 1994-2000**

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Recently, a growing body of evidence from studies in urban areas throughout the world, including our recent studies in Southern California, has linked ambient air pollution to adverse birth outcomes including low birth weight (LBW), preterm birth, perinatal mortality, and cardiac birth defects. To address this research question further, we examined whether ambient air pollution levels during pregnancy influenced the risk of low birth weight (LBW) (<2,500g) or preterm (<37 weeks gestation) birth in infants born to women living in the South Coast Air Basin (SoCAB) of Southern California during 1994-2000. We focused specifically on ambient levels of CO and PM<sub>10</sub> (for which we observed effects previously) and, in addition, PM<sub>2.5</sub> (for which measurement began in 1999-2000). In addition to evaluating a more recent time period during which air pollution levels in the SoCAB continued to decline, we addressed two specific methodologic issues related to our previous work: (1) differences in effect estimates when mapping women's home locations using residential addresses versus zip codes and thereby potentially reducing nondifferential exposure misclassification, and (2) the importance of PM<sub>2.5</sub> versus PM<sub>10</sub> for these outcomes, since smaller particles penetrate deeper into the lung and can result in transfer of potentially toxic compounds into the bloodstream. We obtained residential addresses for each subject and geocoded home locations using a Geographic Information System (GIS) and used these locations to assign ambient air monitoring station concentrations as measures of exposure. We observed a 19% increase in risk of term LBW (OR=1.19, 95% CI=1.00-1.42) and a 13% increase in risk of preterm birth (OR=1.13, 95% CI=1.01-1.26) per one ppm increase in annual average CO when using this residential address mapping method. These results are similar to those observed in our previous studies that relied on zip codes to assign monitoring station concentrations and used 1989-1993 data. In addition, results will be presented for the impact of month- and trimester-specific exposures and the importance of ambient PM<sub>2.5</sub> in comparison to PM<sub>10</sub> levels for these outcomes.

## **10962-PREGNANCY AND POST-MARKETING MEDICATION SAFETY: STRATEGIES FOR PREGNANCY DETECTION IN AUTOMATED MEDICAL RECORDS**

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Post-marketing safety evaluation of medication use during pregnancy is a relatively unexplored area of research. Data provided by the large-scale collection of automated medical records can facilitate such research, but strategies are needed to detect pregnancies in the data. Using the General Practice Research Database from the United Kingdom, our objective was to develop algorithms for mapping early pregnancy markers to related pregnancy outcomes and thereby identify the aggregate record. Eligible women's records from 1991-1999 were searched for codes in 17 pregnancy marker categories and 7 outcome categories. By means of the event dates within a woman's records, earliest pregnancy markers were mapped to pregnancy outcomes. For all resulting combinations, a series of predetermined time restrictions then progressively defined specific combinations as valid. When present, multiple pregnancies per woman were detected by iterations of the algorithm after removal of each valid marker-outcome combination. The mapping algorithm was evaluated by analyzing time between pregnancy marker and outcome dates of valid combinations, and by analyzing unmapped markers and outcomes. A total of 297,214 pregnancies were detected in the data: 80% by an outpatient visit code as the earliest pregnancy marker, and 14% by a laboratory or procedure code. Limiting pregnancies to one per woman aged 15-44 years yielded 209,266 pregnancies. Plotting pregnancies by weeks from earliest pregnancy marker to outcome showed two distribution peaks: one at 0-3 weeks and one at 33 weeks. The early peak was dominated by pregnancies detected with abortion referral codes. The peak at 33 weeks was made up primarily of pregnancies detected by positive pregnancy tests, basic pregnancy codes, or prenatal visits. 80% mapping success was demonstrated through computations with mapped pregnancies and unmapped markers. In conclusion, non-traditional methods of arranging codes and time into algorithms provide a useful tool for pregnancy detection in databases whose size prohibit the audit of printed records. Evaluation of this study's algorithms confirmed a high degree of mapping success and a sensible time distribution from marker to outcome in the automated records of the General Practice Research Database.