

10010 - The effect of social, family and physical activity factors on blood pressure and growth parameters of schoolchildren

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Background and introduction: The aim of the study is to study the possible effect of social, family, personal history and physical activity factors on systolic and diastolic blood pressure (SBP, DBP) and on growth parameters of schoolchildren.

Material and methods: The data from cross-sectional study of 761 schoolchildren (382 boys, 379 girls, age 6-14 years) were collected from the personal interview with parents and from the measurement of the schoolchildren. The questionnaires included data about social factors, income per capita, economic activity of parents, education, recall of birth weight and birth length, reported weight and height of parents, physical activity of children. The measurement of children included body weight, height, BMI, chest, waist and hip circumference. Fat percentage was evaluated from the 4 skin folds (triceps biceps, spina, scapula). Blood pressure was measured (in mmHg on manual sphyngomanometer with IVth Korotkov phase in diastola) as an average from 3 rest measurements. The statistical analysis calculated in STATA and SPSS and multilogistic regression and general linear model multivariate were used (B difference, p value).

Results: The predictors of blood pressure were calculated by regression adjusted for age and sex, the best predictor is body weight (R=0.381), then BMI (R=0.326) and height (R=0.319). The regression coefficients are higher for systolic BP then diastolic and higher in the group of boys rather then girls. Multilogistic regression of the effect of family and social factors showed very limited effect on blood pressure. Statistical significance for BP is accounted as sex, age and body weight adjusted difference B. For systolic blood pressure are statistically significant obesity of children (p<0.001) and mother's economic activity. Higher DBP have obese children, children with higher father's education, with employed mother and in compete families with comparison to incomplete.

Social, family and physical activity factors (adjusted for sex and age) which have statistically significant influence on growth (BMI, weight, height) of children are following: birth order, father's education, mother's education, birth length birth weight, BMI father and BMI mother, reported family history of obesity. Children in obese families (by BMI of mother, father and reported history of obesity) are higher, taller, with higher BMI and fat percentage. Longer free time physical activity and active sporting leads to lower fat percentage, but no changes in BMI. Any effect, neither for blood pressure nor for anthropometric values is resulting from T.V. watching and computer time, breastfeeding, smoking and father's economic activity.

Summary: The children's obesity is the most limiting factor for higher SBP and DBP. The children in higher educated more affluent and economic active families have mostly statistically significant higher body weight body height and BMI. Statistical significance of social, family, physical activity factors is lower for systolic and diastolic blood pressure.

10150- DIARRHEAL DISEASES IN CHILDREN AND MICROBIOLOGICAL GROUNDWATER QUALITY IN A WATER RECLAMATION SITE, MEXICO CITY.

Enrique Cifuentes, Leticia Suárez, Maritsa Solano, René Santos.

Abstract

This study was conducted in order to assess the risk of enteric diseases among children living in a water and land reclamation area in Mexico City.

Methods. A geographic information system (GIS) was used to define eligible wells and surrounding homesteads. A total of 64 water samples were tested for fecal coliforms (FC/100 ml), and 750 eligible households were visited on a random sample basis; only those with children under 5 years of age were interviewed throughout repeated cross sectional surveys, conducted in 1999 - 2000. Data on diarrheal disease episodes (i.e. recall period of last week) were obtained from 761 in the rainy season and 732 children in the dry season, respectively; their guardians also provided information on drinking water supply, sanitation and socioeconomic related variables.

Results and discussion. The presence of indicator organisms in groundwater samples pointed to fecal pollution; bacterial indicators in drinking water, however, did not predict the health risk. The rates of diarrheal diseases were 10.7% in the dry season and 11.8 % in the rainy season, respectively. Children in their second year of life showed the highest rates of diarrhea in the dry season (OR= 2.1 with 95% CI: 0.99, 4.71), particularly those who came from households perceiving unpleasant taste of water and consuming vegetables washed only with tap water (OR= 1.7 with 95% CI: 0.97, 2.92 and OR= 2.2 with 95% CI: 1.10, 4.39). Lower risk was observed in individuals with full time water supply, availability of water for flushing the toilet (OR= 0.5 with 95% CI: 0.27, 0.86 and OR= 0.3 with 95% CI: 0.16, 0.67) and in those storing water in covered jars (OR= 0.3 with 95% CI: 0.15, 0.80). Rainy season data showed that children from households perceiving a color of water had a higher prevalence of diarrhea than those without such complaint (OR= 1.8 with 95% CI: 0.93, 3.67); recent consumption of food sold by street vendors was also a significant risk factor (OR= 1.6 with 95% CI: 0.98, 2.87). Groundwater is at risk, as indicated by the presence of FC. The endemic pattern of diarrhea, however, reflects mostly inadequate sanitation, water related practices at household level and food habits. National regulations on water quality must be updated.

10151- THE RISK OF ENTERIC DISEASES IN YOUNG CHILDREN AND ENVIRONMENTAL INDICATORS IN SENTINEL AREAS OF MEXICO CITY

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Abstract

The overall objective is to promote the development of environmental indicators. Specific examples focused on risk of diarrheal diseases, household characteristics, water quality and sanitation in Mexico City.

Methods. A geographic information system (GIS) was used in order to define eligible wells and surrounding homesteads (0.5 km around each well). A pilot survey was conducted during the rainy season 1997. A total of 1 250 eligible households were visited on a random sample basis, and only those having children under 5 years of age were interviewed. Data on diarrheal disease (i.e. last two weeks) was obtained from 950 children, and their guardians provided information on water supply, sanitation and socioeconomic variables. A total of 320 water samples were obtained from 40 wells, and tested for Total Coliforms (TC/ 100 ml), Fecal coliforms (FC/100 ml), *Escherichia coli* (EC) and *Fecal streptococci* (FS).

Results and discussion. The risk of diarrheal diseases was higher in children from the southern areas than in those from the west (OR= 1.7 and 95 % CI: 0.99, 2.86). The final analysis showed that the rate of diarrhea was higher in children from non - owned homes than those living in owned dwellings (OR= 1.7 and 95% CI: 1.04, 2.77); the risk was also higher in children from houses with poor sanitation facilities (e.g., septic tank) than those connected to sewage disposal system (OR= 1.7 and 95% CI : 1.00, 2.93). Children from households perceiving unpleasant characteristics of drinking water showed a higher risk than those without complains (OR= 2.2 and 95% CI : 1.28, 3.76).

Bacterial indicators were detected in 40% of the wells in the western zone and in 32 % of the southern zone ($p = 0.01$). Linkages between environmental factors and health risk were obtained from spatially distributed information, and the proposed indicator (*EHI*) summarized the most significant predictors of diarrheal diseases. This baseline information may contribute to environmental and public health surveillance.

10172 - A tiered approach to assessing children's exposure: a review of methods and data
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From a public health view, there are many important issues to improving children's and adolescent's health, for example, prenatal and childhood nutrition, immunizations, infectious disease control, and drug/alcohol/tobacco control. There has been increasing emphasis worldwide on protecting children from adverse health effects due to environmental factors, including chemicals. For well-studied contaminants, (e.g., lead) the risks to children are reasonably known and appropriate risk management actions, in a public health context, can be undertaken. For a number of other chemicals, hazard and exposure data are less complete, and risk-based priorities are consequently less substantive. The US EPA's Voluntary Children's Chemical Evaluation Program proposal prompted additional efforts to develop and improve methods and data for assessing children's exposure. The goal is to efficiently identify the substances and conditions that present the highest potential risks to children, so that resources can be applied efficiently to assure their health improvement. The methods we illustrate use an iterative (tiered) approach for a) screening level and b) more detailed exposure assessments relevant to children. We also review and reference the key information sources available for such assessments and analyze the information and method's strengths and limitations.

10178 - Short-term effects of air pollution with fine particles on respiratory morbidity in young children living near 2 power plants.

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In the paper authors suggest that exposure to fine particles presents a potential threat to health, especially in young infants. To day, yet the hazardous effect of this component of air pollution has not been deeply studied.

Objectives: To analyze the relationship between air pollution with fine particles (PM 10 and PM 2.5) and emergency room visits (ER) and/or hospital admissions (HA) caused by respiratory symptoms of children 0-3 years old, living in the nearest area surrounding two power plants.

Methods: ER and HA records collected in three certain hospitals from the study area were explored. Also diagnosis and demographic parameters were used.

In addition to meteorological measurements, fine particles air concentration was registered in 5 different locations within the study area. At first the meteorological and pollution data were averaged over 24 hours (in order to get one-record per day dataset for every location) and then merged with the corresponding ER and HA records.

Statistical methods: Generalized linear Poisson models based on time-series technique and hierarchical approach were created. Possible postponement in respiratory symptoms manifestation ("lag effect") was took into consideration.

Results: We found the statistically significant outcome of PM 10 and PM 2.5 concentrations on ER and HA records of children 0-3 years old from the study area. Also the lag effect of 1-4 days was found. For ER records the lag effect was proved to be shorter than for HA ones.

Conclusion: Air pollution with fine particles has a significant effect on respiratory syndromes in young children.

10221 - Environmental and individual risk factors as predictors of blood lead levels in preschool children in 4 townships of the Urals, Russia.

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We measured blood lead levels (PbB) in 697 preschool children dwelling in 4 towns with different environmental lead levels. These towns are situated at different distances from 3 big copper smelters giving in sum ca. 80% of the total lead emissions from industrial sources in Russia. Parents of each child filled in a special questionnaire on house conditions, behavioral peculiarities, nutrition, parents' job and so on. We found a good conformity between model predictions based on average lead exposure and mean measured PbB for a town, which result might be interpreted as a proof of the prevalent input of the lead-contaminated environment into the lead body burden of the children population as a whole. Now we merged all 4 databases and performed multivariant regression analysis to assess the dependence of individual PbB value on a set of variables (the area being one of them). For this merged dataset the geometric mean PbB was 8.42 (95% CI 7.97 – 8.89) ug/dL in boys and 7.55 (7.17 – 7.96) ug/dL in girls. We found that individual risk factors increasing the probability of higher PbB values were habitual gnawing of finger-nails; eating snow, dirt, and scaled paint or plaster; living on lower floors; windows facing traffic. Factors that decrease this probability were regular drinking of milk and intake of vitamins.

10243 - East Bay Children's Respiratory Health Study: The First Look

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East Bay Children's Respiratory Health Study is a cross-sectional epidemiologic study in Northern California evaluating the respiratory health of children and their exposure to traffic-related pollutants. Past studies have demonstrated that children living next to major roads had an increased risk of developing adverse respiratory health symptoms. Because urban air pollution is a significant problem in California, it is important to examine the risks to children who attend schools and reside near major roadways. EBCRHS is the first study of this kind in Northern California.

Using traffic data from the California Department of Transportation and school demographic data from the California Department of Education, we selected ten schools in the San Francisco Bay Area based on their location relative to major freeways and roads. Students attending these schools were predominantly racial/ethnic minorities and were economically disadvantaged. Across the ten schools, the mean proportion of English learners (students with primary language other than English who lack English language skills based on assessment) was 35.3%, with the range of 18.5% to 80.7%. A mean of 27.3% of Spanish language students were not English proficient. A mean of 11.5% of the students at the ten schools were enrolled in CalWorks (aid for families and welfare-to-work program) and 49.6% were enrolled in either the free or reduced cost lunch programs. We invited third, fourth and some fifth grade students to participate in EBCRHS. We obtained information on children's health, family history and home environment via parental self-administered questionnaires. Exposures were assessed through outdoor air monitoring and time-activity questions on the parental questionnaires. The following is the first look at the respondent population.

The overall response rate was 1111 out of 1571 eligible students, or 70.72%. The individual schools' responses ranged from 61% to 83%. The individual classrooms' responses ranged from 42% to 93%. Almost a third of parents/legal guardians filled out the questionnaire in Spanish; 87.4% identified their children as non-White; 31.2% of households were at or below federal poverty level; 10.3% of children were not covered by health insurance; 48.7% of responding parents had high school or less level of education; 7.2% reported having a current regular smoker in the household; 35.7% reported mold/mildew presence within past 12 months; 40.0% reported living within a block of a street with heavy traffic; 16.6% reported heavy truck/bus traffic near child's home; 53.0% of children exercised or played outdoor sports three or more times a week; 14.0% of children had current physician-diagnosed asthma; and 16.7% had symptoms of chronic bronchitis. Preliminary comparison of schools located near major freeways to schools located further away showed no significant difference in the proportion of children with chronic bronchitis symptoms or current asthma.

Further analysis will help shed light on the relationship between children's exposure to traffic-related pollutants at the school site and their respiratory health.

10244 - Children's Health Issues in Environmental Justice Areas

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Building healthy communities for children in Environmental Justice (EJ) areas requires knowledge of the health needs of the communities. Children's health issues in Environmental Justice areas, include: childhood cancers, lead poisoning, asthma, lung infections, iodine deficiency, thyroid cancer, developmental delays, autism, cerebral palsy, severe mental retardation, higher infant and child mortality rates and perturbed stages in the reproductive and endocrine system. Children's health issues associated with EJ areas seem to be characteristic and expected. Children of certain ethnic groups, due to social and socioeconomic factors, are more affected than others. Disease assessment, disease prevention, access and adequacy of healthcare, financing of increased healthcare, adequate transportation to health care facilities to ensure access and proper treatment, and assessment of nutritional challenges due to socioeconomic conditions and geography must be addressed to prevent environmental racism and to rebuild healthy communities. The solutions to these health and social justice problems have been addressed historically on an ad-hoc basis, where the closest models that fit the needs in EJ are from health models in multicultural populations, though those models do not fully incorporate environmental health issues. Biomedical models do not consider the social factors that engender health. Biological, behavioral and social factors must be included in a model that builds health in environmental justice areas. Health, in these areas, is socially, politically and economically produced. The proposed model, "Building Healthy Communities in Environmental Justice Areas" or "Health EJA," poses an epidemiologically based solution for planning community resources after pollution occurs, and can be used as a tool for health professionals. The model Health EJA includes the following factors: 1) Disease surveillance and identification of affected populations of exposures; 2) Health and mental health needs assessment; 3) Development of standardized medical testing for affected populations, including biomarker testing; 4) General needs assessment for existing health and mental health services; 5) Specific needs assessment for required health and mental health services as a result of the pollution; 6) Assessment of barriers to health care of affected populations; 7) Program Planning; 8) Health Promotion; 9) Health Education; 10) Health Communication; 11) Outcomes; 11) Identification of future community health and mental health needs. Health EJA can be applied to a rural or urban setting, as the challenges in EJ areas can be anticipated and are predictable. The funding for new health needs in EJ areas must be addressed on a routine basis rather than on an impromptu basis and should include setting up court appointed community trust funds. Civil rights matters as a result of the pollution, whether criminal or accidental, should be addressed routinely and not on an extemporaneous basis, so statutes of limitations do not prohibit the filing of litigation. Ensuring that all issues are addressed will assist in reducing community violence, controversy and stress, and will produce more healthy community outcomes.

Integration of GPS/GIS & heart rate monitoring in a sampling plan to characterize children's exposure to pesticide spray drift

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Characterizing a child's temporal-spatial path, activity level, and activity type are key components to predicting pesticide exposure. The current study utilizes global positioning systems (GPS), geographic information systems (GIS), heart rate monitoring, a survey instrument, hand wipes, urine monitoring, and air and deposition sampling to construct an holistic exposure profile of children following a pesticide spray event. We have shown in a previous study of 7 children ages 3-8 in Seattle, Washington that GPS can be used to accurately record children's temporal-spatial paths. GPS personal acquisition loggers (GPS-PALs), which were found to be amenable to children when worn in a vest, are used to track children's time-location near pesticide-treated land. Resulting paths are mapped onto USGS digital orthophoto quad maps in GIS software (ArcView 3.2, ESRI, Redlands, CA). Path data are then correlated with environmental measurements and specific activities (level and type) to estimate sequence and location of exposure events. The field stage of the current study will begin in spring of 2002. Data logging wristwatches will be used to record heart rate (a metric of activity level), and ventilation rate will be calculated from heart rate by a standard equation. A parent-reported survey instrument that includes questions about hand-washing and bathing events will be used to estimate dermal contact time. All data collection will begin the night before the spray event and continue for 48 hours. Forty-eight-hour urine samples will be collected and analyzed for pesticide metabolites. Child hand-wipe and surface wipe samples will be collected to estimate pesticide loading. Deposition and air samplers will be deployed inside and outside homes of the participating families. Wipe, deposition and air samples will be analyzed for the pesticide parent compound. Study results seek to delineate potential areas of high exposure following a spray event, and describe children's interface with these 'hot spots'. These data are expected to demonstrate temporal-spatial relationships between predicted exposures and actual dose measured by concentration of pesticide metabolites found in urine. This work is designed to serve as a foundation for future integration of GPS/GIS in pesticide exposure assessments.

10281- Neurobehavioural and cognitive developmental impairment may arise from children's exposure to lead. Exposure scenarios were devised for infants and toddlers, the 2 populations most sensitive to lead toxicity, considering three typical environmental settings, that is, rural, urban, and in the vicinity of lead-emitting industrial sites (excluding exposure from old lead-containing paints). For all 3 scenarios, we used available data describing the current French levels of both lead contamination in various media (water, air, soil) and lead intake through food. Both water consumption and time budget of our study populations were modeled from US.EPA's Exposure Factor Handbook data. Lead concentrations in indoor dust were estimated from outdoor dust concentrations using US.EPA's IEUBK model equations (table I). We used a probabilistic assessment model to assess the proportion of infants and toddlers exceeding the RfD under various exposure models. The lead reference dose (RfD) was taken from the WHO/FAO JECFA literature, that is 4 µg per kg body weight per day.

Table I. Lead intake parameters and assumptions

	Infant	Toddler
Water	Log logistic distribution	Pearson 5 distribution
Food	Normal distributions	
Air	PERT distributions	
Inhalation rate (m ³ /d)	2,5	7
Lead Concentration in air (µg/m ³)	PERT distributions	
Outdoor dust		
Time spent indoor (min)	/	Beta General distribution
Time spent outdoor (min)	0	24 hrs - time spent indoor
Ingested dust (mg/h)	0	20
Lead concentration in dust (µg/g)	/	PERT distribution
Indoor dust		
Time spent indoor (min)	810*	Modeled time spent indoor – 10 h 30
Ingested dust (mg/h)	0,75	3
Lead concentration in dust (µg/g) (US.EPA IEUBK model)	0,7 * C _{Dust} + 100 * C _{Air}	

*Time spent indoor = 24 hrs minus sleeping time (10h30)

As shown in Table II, lead RfD may be exceeded in several situations for both study populations. This stands for France where lead dietary intake is relatively high (30 µg/j for toddlers). We also carried out a sensitivity analysis for all 3 scenarios: the most sensitive parameters are by decreasing importance water consumption, lead dietary intake, and outdoor dust lead concentration. Conversely, air lead concentration is a relatively insensitive parameter. We conclude that it is highly desirable to reach as soon as possible in France the European Union lead target value in water (10 µg/l) and also that it may be advisable to take fuller account of the contribution of soil to lead exposure, especially for children living in the vicinity of lead-emitting sites.

Table II. Percentage of infants and toddlers exceeding lead intake reference dose (4 µg/kg/d) under 3 exposure scenarios

Lead concentration in tap water (µg/l) and populations studied	Rural	Urban	Industrial
10			
Infants	8	10	99,0

50	Toddlers	3	22	99,1
	Infants	69	76	99,1
	Toddlers	64	79	100,0

10321- Blood lead levels and other individual features as risk factors for psychological development retardation in children.

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A more or less prominent defect of cognitive functions with some behavioral abnormalities in children is a well-known key adverse effect of lead on human health. To measure this effect, we used the Raven's Progressive Matrices Test, known to correlate satisfactorily with more widely used IQ, but more appropriate for screening and field studies. We measured blood lead levels (PbB) in 697 preschool children dwelling in 4 towns with different levels of environmental lead due to different location in respect to the biggest Russian copper smelters giving in sum ca. 80% of the total lead emissions from industrial sources in Russia. Each child's parents filled in a special questionnaire on housing conditions, behavioral peculiarities, nutrition, parents' age, job and education, psychological "climate" in family, etc. First of all, it was shown that, on the population level, there exists a good accordance between a town's ranking as regards the percentage of children with PbB>10 ug/dL and its ranking according to percentage of children with unsatisfactory results of Raven's Test manifesting a retarded development. Now we merged all 4 databases and performed a multivariant regression analysis to assess the dependence of individual probability of having unsatisfactory results of psychological testing on a set of variables (PbB being one of them). We found that factors increasing such probability were PbB level, low family income, having relatives with mental disorders, mother's smoking when pregnant with this child, parent(s)' smoking at the time of questioning, parent(s)' alcohol abuse, while those decreasing it were serene family environment, higher age of parents, their higher educational level, more time spared for the child. We conclude that, while the individual PbB level does influence a child's psychological development unfavorably, it exerts its influence on a complex background of many other risk factors.

10323- Early life risk factors of respiratory symptoms prevalence in ca. 6,000 Russian young schoolchildren – a questionnaire-based study.

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The study was implemented within the framework of the International Project on Environmental Management in the Russian Federation (RF) and an Agreement between the Government of the RF and the World Bank for Reconstruction and Development # 3806 from February 6, 1995.

This cross-sectional study was performed in 9 Russian towns, involving about 6,000 schoolchildren aged 8-12. Their parents were asked to fill in a questionnaire (Q) with questions on the children's present and past health status, family history of respiratory problems, household characteristics (including indoor pollution sources like heating, cooking, smoking etc.) and the socioeconomic status of the families. The overall response rate was about 95 %. The primary aim of our analysis was to describe the associations found between the early life factors and respiratory health outcomes. The following health outcomes (as reported in the Q) were chosen for analysis: any cough, wheezing other than with colds, bronchitis ever diagnosed. As early life factors were chosen: birth weight, maternal smoking during pregnancy, parents' chronic lung diseases, parents' asthma, allergy before 2 years of age, chest illness in the age before 2 years of age, any smokers in the family when the child was before 2 years. A logistic regression analysis was conducted for finding variables most significantly associated with each of the above health outcomes, to be included (together with age, gender and area as *a priori* variables) into the full model for each outcome. The analysis of early life risk factors for several important respiratory health outcomes identified a number of statistically significant associations such as allergy and chest illnesses under the age of 2, parents' chronic lung disease (for all health outcomes), low birth weight (for bronchitis ever diagnosed), maternal smoking during pregnancy and parents' smoking when the child was under the age of 2 (for cough of any kind).

10338- Quantitative behavioral assessment as a tool for modeling pesticide dose in children
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An exposure assessment and dose modeling study of pesticides was carried out in the colonia of Rio Bravo, Texas. This community, of approximately 1,200 households is located on the U.S./Mexico border. More than 98% of this community's population is Mexican/American. Working with community leaders, this EPA funded study was a collaborative effort of the NIEHS funded Center of Environmental Health Sciences in New Jersey, the Center for Environmental and Rural Health at Texas A&M University; and the Centers for Disease Control (CDC) in Atlanta. Parents of infants and young children were contacted and recruited, to have their children participate in this study. The children were followed longitudinally over a 24 month period to allow for observation across three developmental stages, which based upon previous studies exhibit distinctly different mouthing behavior patterns. Environmental samples of house dust were collected from a major play area within the child's home. Children were videotaped for a minimum of 4 continuous hours on the day of environmental sampling. Children's hands were rinsed with isopropyl alcohol and the rinse was analyzed for OP pesticides at a commercial laboratory (TDI-Brooks). Urine samples were collected from the next morning void from the children and analyzed for OP pesticide metabolites at the CDC. Videotapes were assessed using a commercially available computer program designed for quantitative behavioral assessment (Virtual Timing DeviceTM - SamaSama Consulting) and a custom template designed by the investigators. In the multivariate regression analysis the most parsimonious model was selected. House dust levels demonstrated no statistically significant association with urinary OP metabolites, even after behavioral interaction terms were evaluated. Frequency of behavior, number of hand-to-mouth and object-to-mouth activities per hour, also exhibited no statistically significant association. The final model included: the hand rinse levels of OPs, the total duration of hand-to-mouth activity, the total duration of object-to-mouth activity (time in seconds per hour), the interaction terms (2) of hand rinse levels of these two activities and whether the child spent any time in water (bathing or in a pool). Residual plots were carried out. The model was highly statistically significant ($p < 0.0001$) with an adjusted $r^2 = 0.70$. Individual parameter estimates and 95% confidence intervals: Hand Loadings of OP = -6.9 (-11.0 - -2.7); Object-to-Mouth Duration = -1.8 (- 5.0 - 1.4); Hand-to-Mouth Duration = 4.3 (2.8 - 5.8); Object/Hand Load Interaction = 3.1 (2.2 - 3.9); Hand/Hand Load Interaction = -1.0 (-1.3 - -0.7); and Spent Time in Water (Yes/No) = -31.9 (-57.2 - -6.5). The results strongly suggest that quantitative behavioral assessment may be very useful in modeling of OP pesticide dose, in infants and young children, from environmental sources. Acknowledgment: This project was supported by EPA STAR Grant# R827440.

10362- Association between lifetime exposure to environmental lead and student performance assessed by the first PISA survey

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Objectives.

Lead exposure adversely affects the cognitive development and behavior of children. There is good evidence that considerable differences exist for the chronological trend in blood lead levels of children in OECD Member countries between 1985 and 1995. On the other hand the first PISA survey of knowledge and skills of 15-year olds carried out in 28 countries of the OECD shows some significant differences in the mean performance and educational outcomes across countries. The aim of this study was to analyze the association between the scores of PISA 2000 and the estimated values for environmental lead exposure established by reported mean blood lead levels of samples of children in previous studies.

Methods.

Data of previous studies about blood lead level of children living in those countries that were included in the first PISA survey were used in order to plot blood lead concentrations against age beginning with 1985 as the year of birth up to 1994. All MEDLINE-registered papers were considered. Data from children living in industrial polluted areas with high exposure risk were excluded. Because no sufficient reports on blood lead levels of children were available for Japan, Korea and Denmark, we used the geometric means for non occupational exposed and non-smoking females as database. The lifetime average blood lead levels up to an age of 10 years were estimated by trend analysis. Spearman rank correlation coefficients were estimated for the relationship between lifetime average blood lead levels calculated for children in the different OECD countries and the corresponding children's performances.

Results.

Lifetime average blood lead concentrations could be estimated for children living in 20 of the 28 OECD countries. For 8 countries no sufficient data was available. The estimated blood lead levels were: <50 µg/l for Finland, Sweden, U.S.A., Denmark; 50 - 75 µg/l for Italy, France, Switzerland, Germany, U.K., Korea, Japan, Canada; 75 - 100 µg/l for Greece, Australia; >100µg/l for Mexico, Spain, Poland, Hungary, Czech Republic, Portugal. There was a consistent inverse relation between estimated lifetime average blood lead levels and the mean scores for student performance on combined reading, scientific and mathematical literacy. The Spearman rank correlation coefficients between lifetime average blood lead concentrations and performances were: combined reading literacy = -0,68 (p = <0,001), scientific literacy = -0,52 (p=0,009) and mathematical literacy = -0,60 (p=0,003).

Conclusions.

This study provides evidence for a significant negative correlation between student performances and early lead exposure of children in 20 countries, participated in the PISA survey. Comparable to lead PCBs also can act as a neurotoxic agent. Their levels in human fluids such as breast milk or cord blood were considerably higher in some industrialized areas of Western Europe, in former Czechoslovakia and Poland than for example in the Scandinavian countries. The neurotoxic implications have to be considered in interpretations of significant differences in the mean performance of students worldwide.

10384- Birth Defects in Four U.S. Wheat - Producing States

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Wheat agriculture in Minnesota, Montana, North Dakota, and South Dakota relies heavily on chlorophenoxy herbicides for control of broadleaf weeds. Results from a previous study showed increased mortality for several cancer sites in rural counties in these four states with a high wheat acreage. The current ecologic study investigates whether an association exists between birth defects rates and wheat acreage in those same counties. Perinatal information by county was obtained for 1995 through 1997 births from linked birth / infant death files from the National Center for Health Statistics. Agricultural information by county was obtained from the U.S. Department of Agriculture web site. Agricultural counties with a mostly rural population were selected, and subdivided into a low-wheat and a high-wheat group based on the percentage land dedicated to wheat agriculture with respect to the median of all agricultural counties. In addition, a group of urban counties with a low level of agriculture was selected. Rates of birth defects were compared between urban and agricultural counties, and between high-wheat and low-wheat counties. Logistic regression was used for the analyses, and odds ratios with 95% confidence intervals were obtained for the comparison of categories of congenital anomalies for combined male and female births with adjustment for covariates. Odds ratios comparing agricultural counties to urban counties were as follows: births with any anomaly 1.95 (1.73-2.19); central nervous system 1.68 (1.12-2.54); circulatory / respiratory 2.12 (1.54-2.93); gastrointestinal 1.12 (0.75-1.67); urogenital 2.73 (2.04-3.64); musculoskeletal / integumental 1.94 (1.58-2.40); chromosomal 2.37 (1.63-3.45); other anomalies 1.67 (1.36-2.05). Odds ratios comparing high-wheat to low-wheat counties were: births with any anomaly 1.16 (0.99-1.36); central nervous system 0.77 (0.41-1.45); circulatory / respiratory 1.85 (1.21-2.84); urogenital 1.17 (0.83-1.66); musculoskeletal / integumental 1.46 (1.12-1.89); chromosomal 0.90 (0.53-1.54); other anomalies 0.72 (0.51-1.00). Births conceived during the months of herbicide application (April, May, or June) were at an additional risk for circulatory / respiratory anomalies in comparison to births conceived during other months of the year (OR 1.56, 95% CI 1.01-2.39). These results indicate that rates of birth defects are increased in agricultural counties of Minnesota, Montana, North Dakota, and South Dakota, in comparison to urban counties. In addition, in counties where wheat is one of the main crops and environmental exposure to chlorophenoxy herbicides and/or their contaminants is likely, rates of circulatory / respiratory and musculoskeletal / integumental anomalies are increased. This information is highly relevant considering the widespread use of these herbicides in the U.S. for weed control in the maintenance of home lawns, road sides, parks, golf courses, national forests, and rangeland. This is an abstract of a proposed presentation and does not necessarily reflect EPA policy.

10388- DOMESTIC GAS COOKING AND RESPIRATORY HEALTH OF CHILDREN

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The results of studies of respiratory issues, especially in children, suggest that the pollution of urban air is probably not the only cause of respiratory illness, and that indoor air pollution may play a role in the etiology of chronic nonspecific respiratory diseases. The aim of this study was to assess the effects of indoor air pollution resulting from the use of gas stoves for cooking on children.

Materials and methods. A total of 598 children (355 boys and 243 girls) aged 6-7 years, living in Kaunas took part in survey. The response rate was 65.2%. A questionnaire prepared according to ISAAC fulfilled by children's parents. The parameters of respiratory function (FVC, FEV₁, FEV₁/FVC, MEF₂₅₋₇₅, PEF) were measured with Pony Graphics 3.5.

Results. The prevalence of asthma and chronic cough was 2.6% and 91% for those that used gas stoves at home for cooking and, 1.9% and 92.5% for those not exposed to gas cooking ($p>0.05$). There were no differences in prevalence of dry nocturnal cough, wheezing and hay-fever between children exposed and non-exposed to gas cooking. The mean values of respiratory function of exposed children were significantly lower than those of non-exposed ones. For exposed children MEF_{25,50,75} and PEF were 2.46 l, 2.06 l, 1.33 l and 2.57 l, for non-exposed 2.62 l, 2.20 l, 1.46 l and 2.74 l, respectively ($p<0.05$). Multivariate regression analysis showed reverse association between above mentioned indices of respiratory function and domestic gas cooking (β from -0.16 to -0.14, $p<0.05$). There was a relation between respiratory function and sex: the girls had lower parameters than the boys.

Conclusion. The data obtained suggest that domestic gas cooking is related to lower indices of respiratory function in children.

10396- TRAINING HEALTH CARE PROVIDERS ON TOXIC THREATS TO CHILD DEVELOPMENT

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Objectives: The Greater Boston Physicians for Social Responsibility prepared a report in 2001 summarizing the recent scientific literature on toxic environmental effects on child development. This report has served as the basis for additional training of health care providers in New York, Boston and San Francisco. The goals and content, as well as initial evaluations of these training sessions will be described.

Methods: A report called "*In Harm's Way: Toxic Threats to Child Development*," a joint educational project of Greater Boston Physicians for Social Responsibility and a national non-profit organization called Clean Water Action, was prepared and published in January, 2001. The authors summarized studies of health effects in children exposed to metals (mercury, lead, manganese), dioxins and PCBs, pesticides and solvents. Special emphasis was given to environmental epidemiology studies in the past decade. The report was widely cited in the popular press, and created the basis for continuing education training sessions over the past year. Plenary sessions, concurrent topical sessions and small group workshops were organized and a training notebook was prepared. A PowerPoint presentation and additional references and fact sheets were provided in participants' materials. Recommendations include precautionary action to protect children from harmful exposures.

Results: The New York City training, in April, 2001, was attended by over 150 health care professionals, agency representatives and community residents. The Boston and San Francisco trainings have been scheduled for Spring, 2002. Evaluations of the initial training indicated strong interest in the topic of environmental threats to children's health and great satisfaction with the materials and presentation of the training.

Conclusions: Training in toxic threats to child development is an important continuing education topic for health care professionals, given the large volume of recent literature. In addition, the policy implications and recommendations are consistent with the precautionary principle.

10415- Children's Activity Patterns in a Texas Colonia

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An observational, environmental measurement study of children's non-dietary pesticide exposure was carried out in the Rio Bravo, TX. Rio Bravo is a small agricultural community on the U.S./Mexico border. This longitudinal study consisted of four rounds of sampling over a two-year period. Fifty-two children from 29 homes were included in the first round of testing. The children ranged in age between 7 and 53 months. Data collected included questionnaire completed by a parent and a videotape of each child's behavior over a four-hour period. Additionally, soil, house dust, hand rinse and urine samples were collected. Analysis of the videotapes was done using the Video Timing Device software (SamaSama Consulting). Each tape was reviewed twice to record first right hand and then left hand contacts. In addition, the location of the child (indoors/outdoors) was also recorded. Most children (49) spent the majority of the time indoors; thirteen of the 52 children did not go outside during the videotaping session. For the remaining 39 children the mean time outdoors was 24.4% of the session (ranging from 0.3 to 187 minutes). Thirteen of the children were in water (pool or tub) during part of the videotaping session; the time in water ranged from 7 to 57 minutes. The average hourly rates of hand-to-mouth activities ranged from 0 to 75.7 contacts, with a mean of 16.5. For the 39 children who spent time in both locations, hand-to-mouth activity was significantly greater indoors than outdoors (16.6 contacts/hr v. 10.6 contacts/hr, paired t-test, $p < 0.05$). The total duration of hand-to-mouth activity ranged from 0 to 25.8% of the session time, with a mean of 3.1%. The duration was not significantly different for indoors v. outdoors (3.0% v. 1.6%, respectively). The average hourly rates of object-to-mouth activities ranged from 0.5 to 49.2 contacts, with a mean of 12.8 (n=52). Object-to-mouth activity was not significantly different between the indoor and outdoor locations (12.6 v. 9.4, respectively, n=39). The total duration of object-to-mouth activity ranged from 0.1 to 13.1 % of the session time, with a mean of 2.3%. The duration was not significantly different indoors v. outdoors (2.5% v. 1.5%). During the analysis, extensive handling of food was noted. Although three children had no contact with food during the videotaping session, the remaining 49 children handled food directly. Of the 39 children who went outside, 18 had some contact with food outdoors. The average hourly rate of food contact ranged from 0 to 50.7 contacts with a mean of 14.5. Food contact was significantly greater indoors v. outdoors (17.6 v. 4.2, respectively). The total duration of food contact ranged from 0 to 24.8% of the session time, with a mean of 5.9%. The duration indoors was significantly greater than the duration outdoors (6.7% v. 2.4%, respectively). Acknowledgment: This project was supported by EPA STAR Grant# R827440.

10429- Environmental Exposure and Puberty Onset in Girls.
SG Selevan¹, K Hogan¹, SY Euling¹, A Pfahles-Hutchens¹, and D Rice¹
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Data suggest that environmental contaminants can affect timing of puberty. Lead exposure could affect puberty onset through at least two mechanisms : First, lead could act indirectly through effects on growth. Height and blood lead levels were inversely associated in several national studies (Hispanic Health and Nutritional Examination Survey, the National Health and Nutrition Examination Survey from 1976–1980 and from 1988-1994). In turn, puberty is associated with growth measures (body mass index, weight and height). Second, lead exposure may influence puberty through effects on the hypothalamic-pituitary-gonadal (HPG) axis. Lead exposure in animals has been associated with changes in levels of pituitary hormones including gonadotropin releasing hormone (GnRH), lutenizing hormone (LH), and follicular stimulating hormone (FSH).

This study examines the relationship between concurrent blood lead levels and measures of female puberty timing, Tanner stages for breast and pubic hair development and age at menarche, using data from NHANES III. Analyses included ordinal logistic regression for the Tanner stages and Cox Proportional Hazards model for age at menarche (SUDAAN). These analyses are based on 8-18 year old girls with at least one measure of puberty and blood lead data: 600 Non-Hispanic White girls; 805 non-Hispanic African American girls and 781 Mexican American girls. Their average blood leads were low: 1.7 ug/dL (CI: 1.5-1.9), 2.7 ug/dL (CI: 2.4-3.0), and 2.4 ug/dL (CI: 2.1-2.7), respectively. Few had blood leads higher than 10 ug/dL (0.4%, 1.4%, and 2.2%, respectively). As with any cross-sectional study, the blood lead level at the time of examination could be different from the level at critical window(s) of development. As in the other examinations of lead and growth, this group had an inverse, statistically significant association of lead and height (beta= -0.152).

In summary, blood lead levels were associated with a delay in all measures of puberty. The delays were statistically significant for all endpoints for African Americans (breast development OR(95%CI): 0.40(0.17-0.94); pubic hair development OR(95%CI): 0.37(0.15-0.91) and age at menarche HR(95%CI): 0.54(0.38-0.76)), and for Tanner scales for Mexican Americans (breast development OR(95%CI): 0.57(0.39-0.84); pubic hair development OR(95%CI): 0.48(0.28-0.82)). While the other findings are not statistically significant, all are similar in direction. These findings, of associations of low lead exposure with delayed onset of puberty, are consistent with an effect of lead on growth or neuroendocrine signaling.

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

10430- TITLE: IMMIGRATION AND TUBERCULOSIS IN CHILDREN

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Introduction:

It is well documented that the risk of active tuberculosis among immigrants is comparable to those living in their own country and very different from residents of host country. Immigration from neighboring countries where TB is highly prevalent is a contributing factor to increase of TB rate among adult and children in Iran. We carried out this study in order to determine the effect of immigration that increases tuberculosis in children.

Methods: During two year of study, all cases of confirmed TB in children who admitted to NRITLD were enrolled. Information on the confirmed TB in children such as nationality, symptoms, result of bacteriology and CXR were collected. Data were analyzed for 85 children with Tuberculosis by Epi 6.04 software package.

Results:85 children with confirmed TB entered our study. The majority of these were immigrant (62.1%) of Afghan origin ($P<0.05$). Pulmonary TB accounted for (68.2%) in Afghan and 31.8% in Iranian children. Failure to thrive (FTT) was present in 88.2% of Afghan and 11.8% of Iranian children ($p=0.008$). Twenty- eight Afghan children (75.7%) had history of close contact whereas, only 24.3% Iranian were exposed to it ($P=0.002$). Afghan girls with history of close contact were 80% while Iranian girls were 20%($p=0.002$). Cavern was found in 100% Afghan children.

Conclusion: Immigrant children because of their special conditions are shown in our study to have different and somehow misleading presentation of disease which due to their economically and socially deprived condition. Therefore a system for screening and monitoring should be advised in our country to both relieve properly and promptly these fragile children for their pain and control tuberculosis optimally.

10476- Vitamin D Receptor *FokI* Polymorphism and Blood Lead Concentration in Children.

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Variation in blood lead among children is due to a complex interplay of environmental, social, nutritional, and genetic factors, but genetic factors that influence lead absorption are poorly understood. Genetic differences in calcium absorption may help explain variations in blood lead concentration because gastrointestinal absorption of lead uses some of the same mechanisms as calcium. Our goal was to determine if a restriction fragment length polymorphism in the VDR gene (*Fok I*) modified blood lead concentration. We hypothesized that children with VDR-*FokI* *FF* genotype, a marker associated with greater calcium absorption, would have higher blood lead concentrations than children with *Ff* and *ff* genotypes, after adjusting for environmental lead exposure. We employed a longitudinal cohort of 275 children, followed from 6 to 24 months. Venous blood and samples of household dust, soil, water and paint were analyzed for lead at 6, 12, 18 and 24 months of age. Interviews were conducted at 6-month intervals to measure nutritional, environmental, and behavioral factors. We used a mixed effects linear model for this analysis of repeated measures. Blood lead concentration varied significantly by VDR-*FokI* genotypes ($p=0.04$). Children with VDR-*FF* had a mean blood lead concentration of 8.2 $\mu\text{g/dL}$ (95%CI, 7.4 to 9.0 $\mu\text{g/dL}$), children with *Ff* genotype had a mean blood lead concentration of 6.7 $\mu\text{g/dL}$ (95%CI, 6.1 to 8.2 $\mu\text{g/dL}$), and children with *ff* had a mean blood lead concentration of 6.1 $\mu\text{g/dL}$ (95%CI, 4.0 to 8.2 $\mu\text{g/dL}$). In repeated measures analysis, lead-contaminated floor dust was the primary source of lead exposure. We found a significant interaction between floor dust lead loading and VDR-*FokI* genotypes on blood lead concentration. For every 1 g/ft^2 increase in floor dust, children with genotype *FF* had a 1.1% increase in blood lead (95% CI, 1.5 to 0.69), children with the *Ff* genotype had a 0.53% increase in blood lead (95% CI, 0.1 to 0.92), and children with *ff* genotype had a 3.8% increase in blood lead (95% CI, 1.2 to 6.3). When children with the *ff* genotype were exposed to floor dust levels below 10 $\mu\text{g/ft}^2$ they had the lowest blood lead levels; however, children with this genotype had the highest blood lead levels when they were exposed to higher floor dust lead levels. We conclude that the VDR-*FokI* polymorphism is a significant modifier of childhood lead exposure.

10584- THE EFFECT OF SUGARCANE-BURNING AIR POLLUTION ON CHILDREN RESPIRATORY DISEASES.

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The adverse health effects of industrial and automotive air pollutants have been frequently associated with both cardiovascular and respiratory diseases. However, studies focusing on the effects of air pollutants generated from biomass burning have been scarce. This study was carried out to investigate the association between air pollutants from different sources and pediatric respiratory hospital admissions in Piracicaba, São Paulo, Brazil, where the cultivation of sugar cane is one of the major economic activities. From April 1997 to March 1998, 98 samples of atmospheric fine particles (PM_{2,5}) were collected in Piracicaba and were analyzed for black carbon, Br, Si, P, K, Mn, S, and Al to identify the primary source of air pollution in the city. Daily number of children respiratory hospital admissions and daily records of temperature and humidity were collected during the same period. Generalized additive Poisson regression models were used to analyze the data and loess smooth function was used to control for time trend, temperature and humidity. Analyses were performed in two periods of time: burning and no-burning seasons. In Piracicaba, the main elements presented in the fine particles were K and black carbon, which are generated during the sugarcane burning. The relative risk (RR) of children respiratory hospital admissions due to mean levels of K (657,2 $\eta\text{g}/\text{m}^3$) and black carbon (4.39 $\mu\text{g}/\text{m}^3$) during the burning period was 1.48 (95% CI: 1.19,1.77) and 1.20 (95% CI: 1.05,1.36), respectively. They were three times bigger than the relative risks observed for their mean levels during the no-burning period. Changes in the RR for children hospital admissions due to variations in the other elements are less expressive, showing the indubitable importance of sugarcane plantation burning as a public health problem in agricultural areas. This abstract was funded by: LIM05-FMUSP, UNISA, and FAPESP.

10591- Which socioeconomic indicators influence the incidence rate of *Helicobacter pylori* infection in infants from a U.S.-Mexico border population? M Keitheri Cheteri¹, KJ Goodman¹, RS McPherson¹, K O'Rourke¹, T Redlinger², A Campos^{1,3}, M de la Rosa⁴, University of Texas, School of Public Health, Houston, Texas, USA; University of Texas, El Paso, Texas, USA; Mexican Social Security Institute, Ciudad Juarez, Mexico, Texas Tech University, El Paso, Texas, USA.

Childhood socioeconomic indicators such as crowded living conditions and low parental education levels have been consistently associated with the prevalence of *H.pylori* infection in cross-sectional studies of varied age groups. Much evidence suggests that new *H.pylori* infections are most frequent in childhood and that not all childhood infections persist long term. However, few studies have addressed whether SES influences both the acquisition and the persistence of *H.pylori* infection in childhood. The Pasitos Cohort Study follows children from birth in El Paso County, Texas and Ciudad Juarez, Mexico at 6-month intervals in order to identify determinants of acquisition and persistence of *H.pylori* infection. We performed this analysis to determine which household socioeconomic indicators influence the incidence of *H.pylori* infection in Pasitos Cohort infants. We examined the following socioeconomic characteristics of parents: education; occupation; income; home ownership; type of floor in the home; type of air conditioning in the home; presence of a working refrigerator; car ownership; and health insurance status. Infants were enrolled in the study prenatally when their mothers were in the 3rd trimester of pregnancy. Mothers were recruited from El Paso WIC clinics and Mexican Social Security Institute maternal-child clinics in Juarez from April 1998 to October 2000 and follow-up of the cohort is ongoing. Information on socioeconomic indicators and covariates was collected by questionnaire. Active *H.pylori* infection is detected in the infants by the 13C-urea breath test; results are corrected for body-size-dependent metabolic variation using Klein's method. Cox proportional hazards modeling was used to estimate the effect of SES on the incidence rate of first detectable *H.pylori* infections after adjusting for selected covariates (socioeconomic indicators mentioned above and father's presence in child's life, mother's residential stability, persons per bed in home, household use of purified water, sewage disposal system, and infant's birth order and breastfeeding duration). A total of 415 infants with one or two follow-up visits through 15 months of age and complete data were included in this analysis. Adjusted rate ratios (RR) showed that among the examined socioeconomic indicators, only the mother's education had more than a minimal effect on the *H.pylori* incidence rate in infancy. Compared to infants of mothers with 0-6 years of education, incidence rates were 3-4 times lower in infants of mothers with more years of school. No effect gradient for increasing education was apparent; RRs [95% confidence interval (CI)] were 0.25 [0.12-0.51] for 7-11 years and 0.31 [0.14-0.69] for 12-17 years. For infants of mothers with 0-6, 7-11, and 12-17 years, incidence rates were 0.41/year (20 / 592 person-months), 0.14/year (23 / 1933 person-months) and 0.17/year (23 / 1637 person-months), respectively.

10649- Association of urinary 8-OHdG with ambient NO_x in school children

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Epidemiological studies have shown that ozone, nitrogen oxides, particulate matter are associated with increased respiratory diseases in school children. To investigate whether oxidative damage is associated with ambient exposure to ozone, nitrogen oxides or particulate matter exposure, we investigated the relationship between the level of urinary 8-OHdG in school children and the levels of ambient ozone, nitrogen oxides and particulate matter. Urine specimens were collected in the morning from eighteen 5th graders (11 boys and 7 girls) for five days in fall, 2000 and seven days in spring, 2001. Questionnaires were completed by the parents of these children. Urinary 8-OHdG levels were determined using competitive enzyme-linked immunosorbent assay (ELISA). Ambient levels of ozone, nitrogen oxides and PM₁₀ were obtained from air quality monitoring station, which was located in the campus. Mean 8 hr ozone concentration ranged between 2.7 and 75.9 ppb, 8 hr PM₁₀ ranged between 14.8 and 160.5 $\mu\text{g}/\text{m}^3$ and 8 hr NO₂ ranged between 11.5 and 68.6 ppb. Mean 8-OHdG was 11.9 \pm 4.3 in fall and 11.6 \pm 7.8 in spring. Linear mix-effected model revealed that urinary 8-OHdG level was associated with the mean concentration of 8-hr nitrogen oxides, nitric oxide and nitrogen dioxide two days before the urine collection. However, there was no association of urinary 8-OHdG with levels of ozone, particulate matter and other potential confounders. We conclude that ambient nitrogen oxides may induce oxidative damage at levels around the current standard.

10683- The changes in the prevalence of chronic diseases and disorders in Slovak 6-14 years old children

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Background: Quality of living conditions and changes of health care are as it is well known reflected in the health status of children and adolescents. From 1989 primary health care for school children at the age 6-14 goes together with many changes in Slovakia.

Objective: The purpose of the study was to assess the global impact of changes in primary child health care and 10-year absence of school health service on prevalence of chronic diseases in school children in Slovakia.

In the year 2000 the cross-sectional study oriented on prevalence of chronic diseases in Slovak school children was carried out. Data have been analyzed in relation to situation in previous time – they were compared with accessible official health statistic data on morbidity since the year 1965 up to 1989. Differences between urban and rural children have been also assessed.

Material and methods: Questionnaires were used for obtaining data on chronic diseases from representative sample of 1859 urban and 1746 rural school children with proportional representation of boys and girls of all age groups (6-14yrs) from all regions of Slovakia.

Results: Since 1965 to 1989 gradual significant increasing of chronic diseases was detected, but the expressive rising prevalence has been revealed in year 2000: in non-specific respiratory diseases (1965: 0,31% – 1989: 2,33% - 2000: 7,71%), allergic diseases (1965: 0,24% – 1980: 0,58% - 2000: 12,93%), orthopedic disorders (1965: 1,65% - 1989: 3,89% - 2000: 15,70%), impaired vision (1975: 5,77% - 1989: 9,62% - 2000: 18,83%) and psychic disorders (1965: 0,67% - 1989: 2,42% - 2000: 3,80%).

Differences between urban and rural area have been confirmed in eye diseases (20,7/ 16,8%, $p < 0,01$), psychic disorders (5,6 / 1,8%, $p < 0,001$), orthopedic diseases (17,5/ 13,8%, $p < 0,01$) and allergic diseases (16,05/ 9,63%, $p < 0,001$) with worse results in urban children.

Conclusion: Negative morbidity trend in school children could be a consequence of non systematic preventive health care during school attendance to detect latent stages of diseases. The problems of the significant increase in prevalence of chronic diseases in children have to be solve in complex. The school health service, which today does not exist in Slovakia, ought to participate in preventive health care of school children. The solving of this problem is also in observation of hygienic principles in educational and teaching process and in health education. Results are the basis for health policy recommendations.

10719- Children's environmental burden of disease in Europe

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Environmental exposures are generally believed to contribute to the burden of disease in children and adolescents. However, the burden of disease attributable to environmental factors is largely unknown, in particular the portion that is preventable. No estimates for the European region are available. The apparently striking geographical differences in morbidity and mortality rates in infants and children across European countries are thought to be at least to some extent causally related to environmental factors. Patterns of morbidity and mortality vary substantially across the European region. For example, standardised mortality rates for acute respiratory infections under the age of five years are on average 100-fold higher in the Newly Independent States as compared with the Nordic average. On the other hand, chronic diseases such as asthma are a major public health concern in the more affluent countries, with more than 10-fold higher symptom rates than in the Eastern countries. In an attempt to assess the impact of environmental quality on children's health, a comprehensive review of evidence was undertaken. Qualitative analyses were made of selected environmental exposures, such as air pollution, pesticides, environmental tobacco smoke, and electromagnetic fields. Childhood diseases, like asthma, cancer, neurological disorders, foodborne and waterborne diseases, and their associations to environmental exposures were reviewed. The relative impact of environmental exposures, as well as the possibility of prevention, were analysed. Factors influencing the environmental burden of disease in infants and children include: lost-life-years and disability-adjusted life years for diseases occurring early in life with life long implications; a strong association between exposure and disease; the frequency of exposure in different countries, and disease incidence. Although the individual risk may be small, the public health impact is considerable when disease rates are high and the exposure is wide spread. The next steps are to develop methodological tools, which will be applied to relevant data sources to derive valid quantitative estimates for Europe. A particular effort will be made to estimate the environmental impact on the burden of disease in children and adolescents living in areas affected by environmental disasters. Information needs and indicators will be discussed. The reduction of children's disease burden due to environmental exposures should guide decision-making, priority setting and allocation of resources in environmental health management.

10760- The effects of outdoor and indoor air pollution on peak flow measurements and allergic status of children in São Paulo, Brazil

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From May to December 1997, a group of 102 students (aged 7 to 9 years old) were studied in order to investigate the effects of outdoor air pollution on their peak flow measurements. The school was chosen because it has a state air pollution monitoring station in its backyard, and 85% of the children lived within 2,5 km from the school. A decrease in their mean peak flow was found to be associated with exposure to air pollution, considering different time lags (hours, previous days, moving averages) and different seasons. Due to the high correlation between the pollutants in the period studied, it was not possible to isolate one single pollutant as the main cause for the observed effect. In average, there was a 1 % decrease in the mean peak flow measurement in the winter and 2 % in the summer for an increase of 50 $\mu\text{g}/\text{m}^3$ in PM_{10} concentration. Some questions were raised about possible biases, such as exposure to other pollutants at home and the presence of an immunologic status that might have made some children prone to a higher response to air pollution. In the light of these questions, a new study is being carried out with the same children. This study includes a questionnaire, daily peak flow measurements for a period of 3 months (March to May, 2002), nasal cytology, prick test, immunoglobulins, white and red cells counts, parasitologic tests. Characterization of indoor air pollution at the school and at the students' houses (dust mites, pests, fungi, mold spores). Concentrations of PM_{10} , NO_2 , CO , O_3 , SO_2 , temperature and relative humidity will be collected for the same period. This study will provide an excellent opportunity to evaluate the rate of lung growth of these children, as it is known that exposure to air pollution early in life might have a deleterious impact in respiratory health in adulthood. Also, we will be able to compare if air pollution exposure has a different impact on the group of children exposed to a higher concentration of aeroallergens at home with the one lower exposed.

10791- Air pollution and height of preschool children in the Czech Republic

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Aim: Growth in childhood is considered to be an important indicator of children's health. The aim of presented study was to assess the effect of long-term air pollution exposure on growth in childhood.

Methods: Preschool children 3 to 6 years old attending 21 nurseries in five towns of the Czech Republic were studied. All children registered in the nurseries were considered to be eligible for the study. Parents were asked to complete a questionnaire on socioeconomic circumstances, life-style of the family, family health history, children's health in the past year and parents' height and weight. Children's height and weight were measured in nurseries by centrally trained staff. Measured heights of children were converted into height-for-age z scores. Mean annual concentrations of nitrogen oxides (NO_x), sulphur dioxide (SO₂) and total suspended particulates (TSP-10) for five towns were obtained from the Czech Hydrometeorologic Institute.

Results: 2366 questionnaires were completed by parents. Valid measurements of height were available for 2275 children (76% of registered children). The mean height-for-age z score was 0.49 (the Czech children were almost half a standard deviation higher than the US standards). Of the socioeconomic variables, education of parents, number of siblings, and maternal smoking were significantly associated with height-for-age z score. After the adjustment for birthweight, parental height, socioeconomic variables and parental health history, SO₂ and NO_x were significantly associated with children's height-for-age z score: there was decrease of 0.23 (p=0.01) and 0.19 (p=0.03), respectively, in z scores per 50 microgram/m³ increase in concentrations of NO_x and SO₂.

Conclusions: This study suggests that there is the association between air pollution concentrations and childhood growths among preschool children in the Czech Republic.

10799- Pesticide Exposure and Immune Function among Toddlers

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Response to vaccination may be a sensitive indicator of immunologic health in young children. Toddlers residing in an intensive agricultural area along the US/Mexican border were enrolled in a pilot study investigating immunologic function and pesticide exposure by multiple routes.

Twenty eligible children, aged 11-18 months, were recruited at local clinics, and were due to receive their first measles-mumps-rubella vaccine. Care-givers were interviewed at enrollment, and again about four weeks later, about the child's history and reported exposure to pesticides. Blood and urine samples were collected at each contact. Hematology, measles-specific antibody titer, and flow cytometric analyses designed to assess lymphocyte markers and activation were performed. Dialkyl phosphate urinary metabolites of organophosphorus pesticides were analyzed by a mass spectrometry-based method. Statistical analyses included univariate and bivariate analysis of immunological outcomes and pesticide exposure measures. The students' t-test was used to evaluate differences in mean values between exposure groups.

Results of the clinical hematology were generally within normal limits. All 13 children who provided sufficient blood for analysis after vaccination developed protective measles antibody titers of 1:3511- > 1:8192. All 19 children who provided sufficient urine had measurable diethyl and dimethyl phosphate metabolites. Mean urinary metabolite concentrations were not significantly different among children from households with pesticide exposure through reported home use or parental occupation. All of the children's mean CD4 levels were significantly lower than published mean reference values (28.7% vs. 39%, $p < 0.001$). Children with reported sources of pesticide exposure had significantly lower mean CD8 levels at both contacts ($p < 0.05$), however, CD8 means were not significantly different between groups of children with total urinary dialkyl phosphate metabolite concentrations categorized above and below the mean.

Although lower mean CD8 levels were seen in children from households with reported pesticide exposure, the interpretation of this finding is unclear due to the small number of children evaluated, and the low CD4 levels found in the entire study population. Total dialkyl phosphate urinary metabolites were not associated with reported pesticide exposure through home use or occupational exposure. This sample of children was derived from a population that may experience multiple toxic exposures from the general environment, however, only biologic measures of cholinesterase-inhibiting insecticides were assessed, and pesticide exposure information collected. Other potential immunotoxicants were not measured. Further investigation of this population is warranted before conclusions can be made about the immunotoxic effects of pesticide exposure in young children. This is an abstract of a proposed presentation and does not necessarily reflect EPA policy.

10916- EFFECT OF ENVIRONMENT ON DENTAL ERESION IN TWO DIFFERENT REGIONS

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Erosion, the loss of tooth surfaces by non-bacterial acids, has a multifactorial etiology and includes acids from dietary, environmental, and gastric sources.

OBJECTIVES: The aim of this study was to compare the effect of acidic nutrition and environment on dental erosion frequency in 13-14 years old students in Yatağan/Muğla and Kocamustafapasa/Istanbul. The relation between the caries frequency and erosion frequency were also researched.

MATERIAL AND METHOD: 223 students, who are between 13-14 years old, included in the study. Yatağan, is a municipality in southern Turkey, where orange and lemon consumption is high due to the prevalent agricultural production of these fruits. There is also a coal-fired power plant in this municipality and individuals are exposed to acid pollution. 108 students [F/M=1,03] were from Yatagan and 115 students [F/M=1,05] from Istanbul. A questionnaire, which includes the questions about acidic nutrition and tooth brushing habits, was performed communicating the students face to face. All the students examined clinically and the results were recorded to the forms that are prepared according to WHO criteria. DMFS (Decay, Missing, Filling surface) and erosion indexes (Lincosalo and Markkonen) were used.

All the data was examined statistically. Man-Witney-U, and Chi Square tests were used for comparisons. P value was considered as 0.05.

RESULTS: Mean erosion prevalence in both regions was 54.3%. Moderate erosion rate was 47.1%. Severe erosion rate was 6.3%. 46.6% of the erosion was in incisal/occlusal surface. 9.4% of it was in vestibul and 1.3% was in lingual surface. Erosion prevalence of students was found in Muğla 56.5% and in Istanbul 48.7 ($p>0.05$). The distribution pattern of erosive defects was very similar in both region groups. Dental erosion was most several the anterior teeth and occurred mostly on the incisor surfaces. On incisal surfaces erosions were distributed relatively evenly with a peak for severe erosion at lower incisors in both groups. Marked erosion at the mesial edges of upper front teeth was observed dummy on examination the pre erosion mesial edges produced characteristic V-shaped on upper incisors. 27% of children showed symmetric incisal erosion. Vestibular erosion was only in the anterior region of the upper jaw and the lower jaw. On oral surfaces erosive defects could be found only in the maxillary and mandibular anterior region.

In the students who brush their tooth within 1 our after eating fruit or drinking fruit juice erosion was more frequent. Difference was found close to significance level ($P=0.07$). No relation was found between DMFS index and dental erosion.

CONCLUSION: In regard to the high consumption of acidic stuffs and beverages in both regions dental erosion prevalence was found high without a statistically significant difference. This drowns us to the conclusion that in spite of the effect of the acidic nutrition (in Muğla fruit, in Istanbul coke consumption), environment is not effective on dental erosion. Consumption of acidic food and drink should be under control.

10970- Air Pollution and Low Birth Weight in California

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Several studies suggest air pollution is linked to low birthweight infants. Many of these studies have been conducted in countries outside the US, and those in the US have found suggestive, but not definitive, results. Additionally, few data have been previously available to evaluate the relationship between fine particles and low birthweight in the US. We evaluate the relationship between air pollution and low birthweight infants in California. Data for infant births, which included maternal characteristics, was obtained from the state of California and geocoded for residence of the mother. Geocoded data were linked to monitoring data for particulate matter 2.5 (PM_{2.5}) and carbon monoxide (CO). Average PM_{2.5} concentrations and 24 hour average CO concentrations (24, 8, and 1 hour concentrations were all highly correlated) for the last three months of pregnancy for mothers living within 10 miles of a PM_{2.5} monitor in urban areas, 20 miles in nonurban areas, and within 5 miles of a CO monitor were computed. Linear regression models, describing the change in birthweight for a change in exposure, were estimated for 52,582 births linked to air pollution monitors among non-Hispanic white, non-Hispanic black, Mexican, and Asian mothers who delivered their first infant after 37 weeks gestation. Multiple births were excluded. Over the last trimester, the average PM_{2.5} ranged from 6.2 to 50.6 ug/m³, and the average CO concentrations ranged from 0.28 to 1.2 ppm. After adjusting for gestational age, an increase in CO of 0.5 ppm was associated with a mean reduction in birthweight by 15.4 g (95% CI 10.9 to 19.9 grams). A ten ug/m³ increase in PM_{2.5} was associated with a mean decrease in birthweight of 28.3 g (95% CI 19.7 g to 31.5 g). After adjustment for maternal race, urbanization, and education, the parameter estimate for CO decreased 25% (mean decrease in birthweight 11.5 g, 95% CI 7 g to 16 g) and that for PM_{2.5} decreased about 20% (20.7 g, 95% CI 14.7 g to 26.6 g). In a combined model of birthweight as a function of both CO and PM_{2.5}, controlling for race, urbanization, and education, a 10 ug/m³ increase in PM_{2.5} was associated with a 17.5 g decrease in birthweight (95% CI 10.3 g to 24.5 g) and a 0.5 ppm increase in CO was associated with a 4.5 g decrease in birthweight, though it was not statistically significant (95% CI 0.87 g to 10.0 g). These results suggest a possible association between air pollution and low birthweight in California.

Views presented are of the authors and not necessarily of US EPA or NCHS.

11067- Study of Exposure and Body Burden of Children of Different Ages to Pesticides in the Environment. J. H. Raymer, G. Akland, and Ye Hu, M. Spruill, K. Briggs, B. Childs. RTI International, 3040 Cornwallis Road, Research Triangle Park, North Carolina. 27709

During the past several years, there have been numerous studies that have shown that there can be differences in the exposures to environmental pollutants experienced by children and adults in similar environments. These differences are derived from a number of factors including activities, diet, routes of exposure, and differences in the way children metabolize and excrete pollutants. An on-going study at RTI will examine both exposure to various pesticides and the resulting doses experienced by children of different ages and adults sampled from both rural and urban homes. The main objective of this study is to test the hypothesis that children have significantly higher environmental exposures and resulting doses than do adults living in the same home. The specific objectives of this project are to: compare exposure and dose levels between young children and adults in the same household; compare exposure and dose levels among young children of different ages; compare exposure and dose levels among young children in urban and rural households; estimate the associations between exposure level and internal dose as well as age-specific differences in the associations; identify age-specific childhood behavior patterns that increase or decrease a child's dose for a given ambient exposure level through the evaluation of videos acquired during monitoring; quantify exposure and dose variability within age groups of young children, and identify biological and physiological determinants of this variability. The study was conducted in two areas of Minnesota: Minneapolis/St Paul/Rice and Goodhue counties in the east and locations in and around Moore county in the western part of the state. Samples of indoor air, personal (breathing zone) air, diet, surface wipe, surface press, house dust, dermal rinse, and pajamas ("body suits") were collected to define potential exposure. In some cases, volatile organic compounds and exhaled breath samples were collected. The target pesticides/herbicides were atrazine, chlorpyrifos, diazinon, and parathion, although each sample was screened for the presence of other organophosphorus and chlorinated pesticides and these were quantified if present. Through the collection of urine samples and analysis for the target pesticides and their metabolites, e.g., chlorpyrifos and its metabolite trichloropyridinol (TCPY) and atrazine and its metabolite atrazine mercapturate, information will be gained about the dose experienced by individuals of different ages resulting from the measured exposure as well as potential differences in metabolism as reflected by differing ratios of parent compound to metabolite in the different age groups. A total of 22 homes and 62 participants in the east were sampled in 2000 and 19 homes and 49 participants in the west were sampled in 2001. Immunoassay-based screening of urines for TCPY to better target homes for full sampling was attempted but was unsuccessful. Low concentrations of pesticides in the environmental samples in the east prompted movement of the study location to the west in year two. Summaries of the data and initial interpretations of the data will be presented.

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**11115- The California Portable Classroom Study:
1. Study Design and Mailed Survey Results**

**Roy Whitmore, Andy Clayton, Mike Phillips, Gerry Akland
Peggy L. Jenkins, Thomas J. Phillips, Jed Waldman**

Concerns over indoor environmental quality in California's schools have risen recently as the demand for new classrooms has resulted in the increased use of portable classrooms. Manufactured buildings may emit hundreds of chemicals from particleboard, plywood, fiberglass, carpets, glues, and other materials used in the construction. Adding to potential problems and environmental factors influencing the physical classroom are the specific activities which may be ongoing during the day that could add to already significant building-related concentrations.

The current study consists of two major parts, a mailed survey to a probability sample of all public schools with at least one portable classroom, and a monitoring study of environmental conditions in classrooms in California. Until this study, there has not been a systematic or comprehensive statewide survey or measurement of indoor environmental conditions in California public schools.

This presentation will discuss the sampling design, the survey instruments and data collection process used in both parts of the study. Emphasis will be on reporting the results from the mailed survey, characterizing the differences between the portable and traditional classrooms.