147. Asthma: from childhood environment to adult phenotypes

Feasibility of measurements of fraction of exhaled nitric oxide (FENO) in a large population based study (ADONIX)

Kristina Wass 1, Lars Modig 2, Kjell Toren 1, Anna-Carin Olin 1. 1Occupational and Environmental Medicine, Sahlgrenska University Hospital, Göteborg, Sweden; 2Occupational and Environmental Medicine, Umeå University, Umeå, Sweden

FENO is used in epidemiological studies as a non-invasive marker of airway inflammation.
Oral Presentation  
Room A3 - 14:45 - 16:45  
SUNDAY, SEPTEMBER 2ND 2012  

**1369 Maternal obesity and inhaled corticosteroid use in childhood**  
Adrian Lowe, Cecilia Eheus, Lennart Bräbäck, Kristina Rajaleid, Anders Hyvärinen, Department of Public Health and Clinical Medicine, Umeå University, Umeå, Sweden; 1Respiratory Diseases Group, Murdoch Children Research Institute, Melbourne, VIC, Australia; 2School of Population Health, University of Melbourne, Australia; 3Department of Woman and Child Health, Karolinska Institute, Stockholm, Sweden; 4Centre for Health Equity Studies (CHESS), Inserm-U1181, University of Pisa, Italy; 5Department of Research and Development, Västerbottens County Council, Sundsvall, Sweden; 6Centre for Epidemiology, National Board of Health and Welfare, Stockholm, Sweden

**Background:** It has been proposed that maternal obesity during pregnancy may increase the risk that the child develops asthma and allergic disease, although the mechanisms underlying this relationship are currently unclear.

**Methods:** The study population comprised a Swedish national cohort of term children born between 1992 and 2008 to native Swedish parents. Maternal BMI was measured at 8-10 weeks gestation. Unconditional logistic regression models were used to determine if maternal obesity was associated with increased risk of inhaled corticosteroid (ICS) use in 431,718 first-born children, while adjusting for relevant confounders.

**Results:** Out of the 5,249 original members of the cohort, 4,325 were located at 15 years of age, and 4,100 performed spirometry. In girls, those who were active in leisure time in both periods had higher % predicted FVC ($p<0.03$) and $FEV_1$ ($p<0.05$) than those who were inactive in the two time periods. In boys, only those who became inactive in leisure time had worse $PEF$ ($p<0.170$ ($95\% CI: 0.331-0.009$) than boys inactive in both periods.

**Conclusions:** It was concluded that leisure-time physical activity during adolescence mainly among girls was associated with better lung function parameters effort dependent.

**1372 IgE-associated phenotypes in 8-year old children. Cluster analysis of European birth cohorts**  
Marta Benet, Jean Bousquet, Josep M. Anton, Joachim Heinrich, Thomas Keil, Henriette A. Silke, Torben Sigsgaard, Cecilia Ekeus, Lennart Bräbäck, Kristiina Rajaleid, Judith Garcia-Aymerich, on behalf of the McDALL Consortium. 1Center for Research in Environmental Epidemiology, (CREAL), Barcelona, Spain; 2Respiratory and Environmental Epidemiology team, INSERM, Villejuif, France; 3Epidemiology, Institute of Epidemiology, Munich, Germany; 4Epidemiology, Charité University Medical Center, Berlin, Germany; 5Epidemiology, Institute for Public Health and the Environment, Bilthoven, Netherlands; 6Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden

**Methods:** The original cohort comprised 5,249 hospital born children during the calendar year of 1993 in Pelotas, Brazil. In 2004-5 and 2008-9, all cohort members were sought for follow-up visits. Physical activity was measured at ages 11 and 15 and classified into active or inactive ($>300$ min/week) in both periods. At the 2008-9 visit, participants were 15 years-old, pre and post-bronchodilator spirometry was performed. Linear regression was used and all analyses were stratified by sex.

**Results:** Out of the 5,249 original members of the cohort, 4,325 were located at 15 years of age, and $4.37; 95\% CI 2.19-8.75$ per $1\mu g/m^3$ increment) and wheeze ($OR=3.24; 1.25-8.45$). These associations were significant after further accounting for the fixed effect of the classroom.

**Conclusions:** Although toluene levels in classrooms were relatively low, long-term exposure seems to be a risk factor for respiratory health of schoolchildren.

**1371 Physical activity trajectories and lung function: The 1993 Pelotas birth cohort study**  
Ester Krein, Ana Maria B. Menezes, Ludmilla M. Miazza, Marcelo C. Silva, Ricardo B. Noal, Pedro C. Hallal, Rogelio Perez-Padilla, Andrea Hyvärinen, 1Post-Graduate Program in Epidemiology, Federal University of Pelotas, Brazil; 2National Institute of Respiratory Diseases, National Institute of Respiratory Diseases, Mexico City, Mexico; 3Post-Graduate Program in Physical Education, Federal University of Pelotas, Brazil

**Background:** Practice of physical activity is stimulated by the United Nations. Ihas been considered a protective factor for several chronic diseases. Inconsistencies are found in the literature to evaluate the association between physical activity and parameters of lung function in adolescence.

**Objective:** To evaluate the association between physical activity trajectories from 11 to 15 years old and lung function at 15 years.

**Methods:** The original cohort comprised 5,249 hospital born children during the calendar year of 1993 in Pelotas, Brazil. In 2004-5 and 2008-9, all cohort members were sought for follow-up visits. Physical activity was measured at ages 11 and 15 and classified into active or inactive ($>300$ min/week) in both periods. At the 2008-9 visit, participants were 15 years-old, pre and post-bronchodilator spirometry was performed. Linear regression was used and all analyses were stratified by sex.

**Results:** Out of the 5,249 original members of the cohort, 4,325 were located at 15 years of age, and 4,100 performed spirometry. In girls, those who were active in leisure time in both periods had higher $FEV_1$ ($p=0.086; 95\% CI: 0.007; 0.165$) than those who were inactive in the two time periods. In boys, only those who became inactive in leisure time had worse $PEF$ ($p=0.170$ ($95\% CI: 0.331-0.009$)) than boys inactive in both periods.

**Conclusions:** It was concluded that leisure-time physical activity during adolescence mainly among girls was associated with better lung function parameters effort dependent.

**1370 Relationships between school indoor tolerate and respiratory symptoms in children of five European countries (HESE study)**  
Mariana Gómez, 1,2 Isabella Amore-Maenza, 2, Torben Sigsgaard, Gunilla Viel, 1Pulmonary Environmental Epidemiology Unit, CNR Institute of Clinical Physiology, National Research Council, Pisa, Italy; 2UMR-S 707 and INRETS, University Pierre et Marie Curie and INSERM, Paris, France; 3HESE Collaborative Group, University of Siena, Italy; 4CNR Institute of Biomedicine and Molecular Immunology, National Research Council, Palermo, Italy

**Aims:** To assess whether indoor tolerate may affect respiratory health in schoolchildren.

**Methods:** Health status and related risk factors were assessed through questionnaire analysis ($k$-means), according to the distribution of 21 variables (phenotypic traits), aimed to identify phenotypes of allergic diseases in children using hypothesis-free statistical analyses. A total of 14,625 children (50% female) aged 8 years from 5 European birth cohorts (MAS, BAMSE, PIAMA, LISA, and GINI) were included in a common database with 83 variables obtained through harmonization of standardized questionnaires. Children were grouped, using partitioning cluster analysis ($k$-means), according to the distribution of 21 variables (phenotypic traits), covering asthma, rhinitis, dermatitis, food allergy, specific IgE levels, and child characteristics. Two groups emerged as the best separation maximizing between- and minimizing within-groups distances. The prevalence of most allergic diseases

inflammation. Some patients do not manage to fulfill the measurement criteria. The objective was to examine if there are any differences between subjects that do and do not manage to perform a correct FENO measurement, mainly relating to respiratory disease and differences in lung function. The Adonix-cohort comprises a general population sample of 6,296 subjects (52% women), aged 25 to 75 years. They have all been examined with FENO (NIOX, Aerocrine™), lung function estimators and blood samples. To fulfill the measurement criteria for FENO the subjects had to exhale at a 50 mL/s ±10% (mean level 45-55 mL/s and allowed instant flow 40-50 mL/s) during the last 3 seconds of the expire in accordance to international guidelines. 217 subjects (3.4%; 67% women) were unable to perform a correct test. These subjects were characterized by significantly lower lung function; FVC 3.6 vs 4.2 L (p<0.001) and FEV1 2.8 vs 3.3 L (p<0.001), but also lower predicted lung function; FVCpred 105.3 vs 109.9% and FEV1pred 98.3 vs 103.4%. In addition, we found a statistically significant over representation of subjects with asthma (13.1 vs 8.8%) in the group that did not manage to perform the test. In conclusion, the overall success-rate of FENO measurement was high. Subjects that failed the test were more likely to have lower lung function and more likely to have asthma than subjects that fulfilled the measurement criteria.
oral presentation

Abstract printing supported by Chiesi Visit Chiesi at Stand B2.10

Valerie Siroux
An ECRHS-SAPALDIA-EGEA study
Temporal stability of asthma phenotypes identified by a clustering approach:

Background: The temporal stability over time of asthma phenotypes identified using clustering methods has never been addressed.

Aims: To assess whether repeated Latent Class Analysis (LCA) applied in asthma a decade apart leads to the identification of comparable phenotypes, and to characterize the transition between them.

Methods: The LCA was applied twice, 10 years apart, on data from 2399 asthmatic adults recruited in 3 epidemiological surveys using standardized protocols: ECRHS (European Community Respiratory Health Survey, n=1450), SAPALDIA (Swiss cohort study on air pollution and lung disease, n=589) and EGEA (Epidemiological study on Genetics and Environment of Asthma, n=360). 14 variables covering personal characteristics, asthma symptoms, treatment, age of asthma onset, allergic characteristics, lung function and bronchial hyperresponsiveness were considered at both time points.

Results: A model with four latent classes was selected at each time point (prevalence between 14%-36%, mean posterior probability 84%). Two of them were predominantly composed of subjects with active asthma, mainly differing by allergic status and age at onset. Two others were predominantly composed of subjects with inactive-mild asthma, mainly differentiated by allergic status. Most of the population (60%) was assigned to the same asthma phenotype at both time points, although stability varied between phenotypes (from 47% for “active adult-onset asthma” to 68% for “inactive-mild non-allergic asthma”).

Conclusion: Asthma phenotypes identified by a clustering approach 10 years apart were comparable. Further analyses will be conducted using Latent transition analyses.

SUNDAY, SEPTEMBER 2ND 2012

1373

Serum eosinophil cationic protein (ECP) in adult monosymptomatic and dizygotic twins

Simon Francis Thomsen1, Asger Sverrisd2, Sophie van der Shuis3, Kirsten Ohan Kyvik4, Vibeke Backer2, 1Department of Dermato-Allergology, Gentofte Hospital, Copenhagen, Denmark; 2Department of Respiratory Medicine, Bispebjerg Hospital, Copenhagen, Denmark; 3Department of Functional Genomics & Department of Clinical Genetics, VU University Medical Center, Amsterdam, Netherlands; 4Institute of Regional Health Services Research & Odense Patient Data Explorative Network, University of Southern Denmark, Odense, Denmark.

Aim: To identify predictors for variation in serum levels of eosinophil cationic protein (ECP) and to determine the relative proportion of the variation in ECP that is due to genetic and non-genetic factors in an adult clinical twin sample.

Methods: ECP was measured in 256 complete twin pairs and 63 single twins, who were selected through a questionnaire survey of 21,162 adult twins from the Danish Twin Registry. Interview data and tests for atopic diseases were collected. Data were analysed with regression and variance components models.

Results: The median level of serum ECP was 5.75, range (0.84-91.95). Sex (p=0.002) and airway responsiveness to methacholine measured as logDRS (p=0.001) were significant predictors of serum ECP. The intra-class correlation of serum ECP was 0.48 in monozigotic and 0.31 in dizygotic twins. Genetic factors explained 53% (39-67%), p=0.000, of the variation in serum ECP, whereas the remainder of the variation was attributable to random non-genetic variation. The genetic correlation between serum ECP and airway responsiveness was small and insignificant.

Conclusions: About half of all variance in serum ECP is due to genetic factors. Moreover, serum ECP levels are influenced by sex and airway responsiveness but this is not due to genetic similarity between this trait and serum ECP.