380. From birth to adulthood – life course determinants of asthma

E4251
Lower respiratory illness (LRI) in very preterm infants: results from the Italian area-based “action” cohort
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Advances of neonatal care may have modified long-term respiratory health of very preterm infants. Valid estimation of outcomes requires studies of geographically defined populations.

As part of a larger project on Very Preterm Pregnancies and Births (ACTION), all infants born at 22-31 wks gestational age (GA), and discharged in 2002-2005 in 5 regions from Northern, Central and South of Italy (22% of Italian total births) were invited for a pediatric examination and a parental questionnaire at 2 yrs corrected age.

Among 1414 infants discharged alive, 1102 returned for the follow-up visit, while for 72 information was obtained from the family doctor (response rate: 83%).

Frequency of bronchopulmonary dysplasia (BPD), defined as O2 dependency at 36 wks postmenstrual age, was 10.1%; 2.7% were still on O2 at discharge, and 0.3% at follow-up. Among the 1102 visited children, frequency of LRI (bronchiolitis, bronchitis or pneumonia with or without wheezing) in the previous 12 months was 31.8% (range: 47.3% at 22-25 wks GA to 27.6% at 30-31 wks, p<0.001); 14.2% had at least one hospital admission for LRI life-time (from 24.0% at 22-25 to 13.1% at 30-31 wks, p 0.083); 5.4% received O2 and/or ventilation during the hospital stay.

The prevalence of LRI was similar in infants with BPD (34.8%) and in those without (31.5%); BPD had more respiratory problems requiring admission to hospital (26.4% vs 12.8%, p<0.001) and ventilation or O2 administration (13.8% vs 4.5%; p<0.001).

In conclusion, in a area-based cohort of very preterm infants we recorded a high frequency of LRI; high rate of recurrences and severe diseases were confined to the smaller babies and to those with BPD.

E4252
Aetiology of wheeze onset during infancy in the Paris birth cohort
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Wheeze being the most important symptom of asthma, we aimed to assess the factors related to wheeze up to age one in our ongoing birth cohort study, taking into account the time of wheeze onset.

A Cox proportional hazard model was used to test the relations between wheeze onset and various risk factors regularly reported all along the first year of life.

Results are expressed as adjusted hazard ratios (HRA[95% CI]).

The analysis was performed on 3054 infants. Wheeze incidence up to age one was 28.5%. Wheeze onset increased with 1 (HRA: 1.34 [1.05-1.72]) and 2 (HRA: 2.37 [1.32-4.28]) asthmaic parents, male gender (HRA: 1.30 [1.11-1.52]), the number of bronchitics/bronchiolitis (+1/month) (HRA: 5.32 [4.34-6.53]) and their related variables, such as the number of children (+1) at home (HRA: 1.17 [1.04-1.31]), bedroom shared with siblings/parents (HRA: 3.56 [2.81-4.49] and earlier age (-1 month) at day care attendance (HRA: 1.12 [1.06-1.19]). Increasing length (+1 month) of breastfeeding (HRA: 0.94 [0.91-0.97]) and exposure to furry pets (HRA: 0.75) (p<0.90) protected against wheeze onset whereas the number of signs of dampness (+1) at home increased the risk of wheeze occurrence (HRA: 1.07 [1.00-1.15]). Our analysis also highlights the inverse relation between wheeze and eczema (HRA: 0.60 [0.49-0.74]), upper respiratory infections (+1/month) (HRA: 0.58 [0.50-0.67]) or otitis (+1/month) (HRA: 0.26 [0.18-0.38]).

As wheeze usually occurs in association with lower respiratory infections, most information on risk factors of wheeze onset provided by the Cox proportional hazard model are similar to known factors related to respiratory infections. Moreover, several observed relations are consistent with the hygiene hypothesis.
Using a multidimensional classification of asthma-like symptoms (wheeze, dyspnea, nocturnal dry cough, shortness of breath), we aimed to identify respiratory phenotypes and their related factors among Paris whole-population birth cohort infants.

Partitioning around medoids was used to cluster infants in 3 groups (G0/G1/G2) according to their respiratory symptoms regularly reported during the first year of life. The relations with various factors, using G0 as the reference group, were tested using a polytomous logistic regression.

The G0 group was formed of 1786 (67.8%) infants, mostly asymptomatic. Besides, 2 distinct respiratory phenotypes emerged, with specific related factors. The G2 phenotype (23.5% of infants) was defined by dyspnea with sleep disturbance associated with ≥1 other respiratory symptom in half of cases: it was strongly related to upper and lower respiratory infections. Postnatal exposure to environmental tobacco smoke and less common pet possession were positively linked to G2; a similar trend was noted in case of early day care attendance. All G1 infants (8.7% of infants) had nocturnal dry cough without any other respiratory symptom in two-thirds of cases. Parental asthma, eczema, food allergy, a birth in spring/summer and early day care attendance were more common among G1 vs G0 infants. The G1 phenotype could be related to allergy, consistent with other relations we identified: frequent cleaning of the dwelling and increasing length of breastfeeding were inversely linked to G1 while early parental separation was positively associated with this phenotype.

Further follow-up will determine the clinical future of these 2 respiratory phenotypes we identified in the first year of life.

E4254 Childhood wheeze: one or several diseases?

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Background: Since several decades it is disputed whether childhood wheeze is a single disorder with severity gradients (gradient model), or consists of several distinct phenotypes (phenotype model).

Aim: Using statistical methods, we determined which of these models better explained cross-sectional data on symptoms from 1-8 years.

Methods: From questionnaire surveys at ages 1-2, 3-4, and 5-8 years of a population-based childhood cohort, we used the following symptom data: wheeze (frequency, shortness of breath, triggers, sleep and activity disturbance), cough (with/without colds, at night), colds (frequency), chronic rhinitis, and throat infections. We fitted different latent variable models which allowed for A. a single phenotype with one or more gradients (gradient model), B. more than one phenotype and no gradients (phenotype model), C. more than one phenotype and a gradient within each phenotype (combination model). Model performance was compared using the Bayesian Information Criterion (BIC), lowest values indicating better performance.

Results: Models of the gradient model performed better (lower BIC) than other models (Table 1).

Table 1. BIC for different latent variable models

<table>
<thead>
<tr>
<th>Type of model</th>
<th>A (Gradient)</th>
<th>B (Phenotype)</th>
<th>C (Combination)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of phenotypes</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Number of gradients within phenotypes</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1-2 yrs (n=426)</td>
<td>1094</td>
<td>1039</td>
<td>1049</td>
</tr>
<tr>
<td>3-4 yrs (n=220)</td>
<td>1020</td>
<td>1017</td>
<td>10475</td>
</tr>
<tr>
<td>5-8 yrs (n=423)</td>
<td>9345</td>
<td>9334</td>
<td>9508</td>
</tr>
</tbody>
</table>

Minimum BIC across a row (bold) indicates preferred model for that age group.

Conclusions: When considered alone, data on symptoms at a given age support the single disease concept. Further analyses should also include physiological measurements and time course of disease.

E4255 Early day-care and the risk of wheeze from 1 to 8 years

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Introduction: Data confirming a protective effect of early day-care on the risk of later wheeze are conflicting. We assessed the association between day-care use at the age of 1 yr and risk of wheeze up to age 8 yrs in a cohort study.

Method: In repeated questionnaire surveys of a UK population-based birth cohort of 4247 children, day-care was assessed at the age of 1 yr, and respiratory outcomes to age 8. We used time to event analysis and multivariable logistic regression, adjusting for several confounders (perinatal, socioeconomic and demographic factors, parental smoking, siblings and breastfeeding).

Results: 75% attended day-care during their first year. Day-care was associated with an increased adjusted prevalence of wheeze at the age of 1 yr (OR 1.25 (95% CI 1.07-1.46)), a decreased prevalence at the age of 4 (0.77 (0.60-0.99)) and no difference at the age of 6 (0.94 (0.71-1.25)). Survival analysis (figure 1) suggests that day-care is associated with an earlier onset of wheeze, but that, by the age of 8, the proportion of children having ever wheezed is identical in both groups.

Discussion: These data suggest that early day-care might influence the timing of the first episode of wheeze, but that the overall proportion of children having wheezed by age 8 does not change. Thus the “protective” effect of day-care might mainly be a shift of the prevalence peak of transient wheeze to a younger age.

E4256 Consultations for respiratory illnesses in infants: ineffective health care utilization?

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Introduction: Respiratory symptoms (RS) are common in infancy. Although in the majority of children RS are mild and self-limiting, these symptoms are an important reason for general practitioner (GP) consultations and prescription of medication.

Aims and objectives: To investigate the percentage of children who visit their GP and receive medication for RS in the first year of life.

Methods: Infants were participants of the ongoing WHISTLER-project, a prospective birth cohort on respiratory illnesses. Physician diagnosed RS were classified in medical records using the International Classification of Primary Care and medication was classified according to the Anatomical Therapeutical Chemical classification.

Results: From 1306 WHISTLER-participants (646 girls, 660 boys) GP visits and prescriptions in the first year of life were documented. 759 (58%) infants visited their GP for lower or upper RS (total of 1926 visits). 42% ever received medication for RS in their first year of life (inhalation corticosteroids (5%), salbutamol (18.3%), systemic antibiotics (29.5%) or xylometazoline (9.4%). In 884 visits no medication was prescribed (46%). Of all infants who received a prescription for salbutamol, only 19% received a second prescription.

Conclusion: Medical care consumption for RS is high during the first year of life. Most RS have a self-limiting character and a large part does not need any medical intervention. To reduce GP consultations and prescriptions for RS in infants, we developed WHISTLER-online, an online parent education program. Preliminary findings with this program will also be presented at the Congress.

Figure 1. Proportion of children with wheeze ever by age (Kaplan-Meier failure curves) according to day-care attendance.
E4257 Early respiratory morbidity in a multicultural birth cohort. The generation R study
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Background: Ethnic differences in the prevalence of asthma symptoms in children have been described. Objectives: We evaluated the effect of ethnic background on lower respiratory symptoms (wheezing, breathlessness, cough, persistent phlegm and doctor-diagnosed asthma) during the first 2 years of life. We also evaluated to what extent ethnic differences could be explained by mediating effects of risk factors for respiratory morbidity.

Methods: The Generation R Study is a multi-ethnic, population-based birth cohort study. Respiratory morbidity and pre- and postnatal risk factors were prospectively assessed by questionnaires. Odds ratios and 95% confidence intervals (OR/95% CI) were computed by logistic regression in order to evaluate the risk of lower respiratory symptoms at 1 and 2 years in non-Dutch ethnicities (Cape Verdean, Moroccan, Antillean, Surinamese, Turkish) compared to Dutch ethnicity.

Results: Antillean ethnicity was associated with increased risk of lower respiratory symptoms at 2 years (1.841 9.2.841), which was mediated by socio-economic variables. Infants of Turkish ethnicity had increased risk of lower respiratory symptoms both at 1 and 2 years (1.371 1.02-1.83) and 1.480 (1.12-1.97) respectively. Antillean ethnicity was associated with reduced risk of lower respiratory symptoms at 2 years (0.670 0.46-0.97) only after adjustment for all the potential mediators and confounders.

Conclusion: Ethnic background is associated with respiratory morbidity during the first 2 years of life. This association is only partly explained by the mediating effect of pre- and postnatal risk factors for respiratory morbidity.

E4258 Swimming during infancy increases the risk of bronchialitis
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Introduction: Recent studies have suggested that swimming during infancy may increase the risk of wheezing and lower respiratory tract infections. The possible association of infant swimming with bronchilitis specifically has not been explored yet.

Objectives: We assessed whether chlorinated pool attendance before the age of two is related to higher risks of bronchilitis.

Methods: We examined 425 children (47% of girls, mean age 5 years, 50 in kindergarten schools. Information about medical history, chlorinated pool attendance and other risk factors was obtained by questionnaire. Logistic regression analyses were used to evaluate associations between pool attendance and bronchilitis after adjustment for other risk factors (parental asthma, smoking, day care...). Children who had never attended a swimming pool during infancy served as references.

Results: The risk of bronchilitis was increased among children who had ever attended an indoor pool (OR 1.71, 95% CI 1.15-2.64), an outdoor pool (OR 1.37, 95% CI 0.84-2.25) or either type of pools (OR 1.87, 95% CI 1.18-2.97). For both types of pools, analyzed separately or in combination, the risk of bronchilitis increased with the number of hours spent in the pool. The ORs associated with the attendance at either type of pool increased to 1.54 (95% CI 0.85-2.80) after 1-9 h and to 2.07 (95% CI 1.24-3.44) after more than 20 h spent in pools (p for trend < 0.02). Excluding children with parental asthma or maternal smoking during pregnancy strengthened these associations (p for trend < 0.01). Conclusion: Attendance at chlorinated pools during infancy is associated with an increased risk of bronchilitis. This study is supported by the Belgian Science Policy (ANIMO project).

E4259 Nasal epithelium damage, chlorinated pool attendance and risk of sensitization to aerosol allergens
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Introduction: prevalence of allergic rhinitis and hay fever has increased over the last decades. Damage to nasal epithelium caused by irritants such as chlorine products could be implicated in this increase.

Objectives: The aim of our study was to assess the relationships between chlorinated pool attendance, sensitization to aerosol allergens and markers of epithelial damage in nasal lavage fluid (NALF).

Methods: We measured albumin (Alb) and Clara cell protein (CC16) in NALF from each nostril of 478 adolescents (age 15-18 yrs), who had no signs of rhinitis and were not under medication for asthma or allergies. We adjusted the concentration of Alb and CC16 in NALF for the serum/NALF urea ratio and calculated the means and ratio of CC16 and Alb. We also measured total and aerosol-ligrogen-specific IgE in serum. Stepwise and multiple regression analyses were used.

Results: Attendance at indoor chlorinated pools was the only factor influencing, both negatively, CC16 levels and the CC16/Alb ratio in NALF (both P<0.01). Active smoking decreased CC16 in NALF (P=0.05) but had no influence on the CC16/Alb ratio. These factors did not affect Alb in NALF which varied only with age and sex. Among adolescents with serum IgE>30 kU/L, those in the lowest quartile of CC16 or of the CC16/Alb ratio in NALF had greater risk of sensitization to aerosol allergens as compared to subjects in the highest quartiles (adjusted ORs 2.16, 95% CI 1.05-4.41 and 2.52, 95% CI 1.09-5.83, respectively).

Conclusion: These findings suggest that exposure to pool chlorine can cause changes in nasal epithelium which facilitate the sensitization to aerosol allergens. This study was supported by the AI societe, France.

E4260 The association between lifestyle factors and asthma or wheeze
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Background: The focus on healthy lifestyle factors and asthma has typically been on weight status, with little regarding activity and poor diet.

Aims and objectives: We investigated associations between diet, activity level and overweight status with asthma/wheeze as well as the interrelationship between these lifestyle factors.

Methods: We conducted a case-control study of 6-18 year olds in the Hum- ber River region of Canada (774 cases vs 824 controls). Cases (n=87) were subjects reporting episodes or breathing medication use along with doctor-diagnosed asthma or wheeze in the past 12 months. Controls were randomly selected (n=208) and without asthma/wheeze. Data regarding health outcomes, diet and activity were obtained from questionnaire.

Conclusions: ively measured height and weight were used to calculate BMI and determine overweight status.

Results: In the adjusted analysis, there was a trend (p=0.07) towards an increased risk of asthma/wheeze associated with high fast food and/or pop consumption but no association between activity levels or being overweight and asthma/wheeze. Among cases, a significantly (p<0.05) lower proportion (66%) classified as over-weight participated in hard exercise in >9 of the 14 days compared to those who were not overweight (86%). This pattern was not seen when comparing over-weight to non-overweight controls (76% participating in hard exercise vs 78%, respectively).

Conclusions: Overweight status may negatively impact activity level among those with asthma/wheeze supporting a need for more research in the area of asthma, diet, and activity. Efforts should encourage good food choices and activity programming must consider the needs of overweight children with asthma.

Funding: CIHR MOP-57907.

E4261 Habitual snoring in school children: prevalence, risk factors, school performance
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We aimed to determine the prevalence of snoring in primary school children in Sivas city, and also to evaluate the nighttime and daytime symptoms and learning problems that may be associated with sleep problems in these children. The questionnaire was distributed to children by their teachers at school and was filled out by their parents. Of the 2196 given questionnaires 1952 (88.7%) were filled and adequately were accepted for evaluation. Of the students (50.9%) were girls and (49.1%) were boys. Mean age was 10.27±2.25 years. The prevalence of habitual snoring was found as 4.9%. Occasional snoring and habitual snoring was significantly more prevalent in boys than in girls. Habitual snorers had sig- nificantly more nighttime symptoms, such as witnessed apneas (odds ratio [OR], 22.07; 95% confidence interval [CI]: 6.84-563.4), difficulty breathing (OR, 68.46; CI, 12.11-290.76), nocturnal emesis (OR, 4.12; CI, 1.49-113.3), compared to never snorers. There were also increased prevalence of daytime symptoms, such as falling asleep while watching television (OR, 4.67; CI, 2.68-8.26), and morning headache (OR, 4.53; CI, 2.51-8.87). The presence of predisposing factors (get frequent cold, frequent tonsillitis, hay fever, and history of tonsillectomy, etc.) increased the likelihood of habitual snoring. Both nighttime symptoms (apnea, difficulty breathing, restless sleep, nightmares, bruxism, etc.) and daytime symptoms (falling asleep in public places, morning headache, etc.) were highly correlated with habitual snoring in children and habitual snoring was related with parent-reported poor school performance.
E4262 Lower lung function in children from homes with biomass cooking. A study from Pakistan
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Objectives: Biomass is extensively used as a fuel for cooking in developing coun-
tries. It is estimated that 2.5 to 3 billion people depend on biomass for daily energy needs. Studies among women and neonates showed detrimental health effects due to exposure of biomass smoke. The effects of biomass use for cooking in children remain largely unknown. Therefore, we investigated the association between lung function, exhaled NO and exposure to biomass combustion in a susceptible period of life.
Methods: We administered a respiratory questionnaire and measured spirometry (Sporobank) and exhaled NO (Niox Mino) in 300 children aged 8 to 12 y old from Lahore and nearby villages. Of these, 220 were schoolchildren, and 80 children engaged in carpent weaving (n=40) or brick making (n=40).
Findings: Lung function manoeuvres were successful (forced expiratory time > 1 s) in 113 children (38%). The mean age of these children (39% girls) was 10.2 y (SD = 1.4), Forty (35%) children were exposed to biomass smoke. Children growing up in households using biomass for cooking had lower FVC (<0.15 L p<0.034) and FEV1 (<0.16 L p=0.022) compared with those not exposed to biomass, inde- pendently of age, gender, height, reported exposure to indoor smoking, and the duration of manoeuvre. Exhaled NO did not differ between the two groups (14.6 vs 14.1 ppb p=0.69).
Conclusion: Exposure to biomass is associated with lower FVC 17.3% and FEV1 16.9%, necessitating targeted preventive measures.
E4263 Bronchoalveolar lavage pepsin in asthmatic children – is there any evidence of pulmonary aspiration occurring between asthma attacks?
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Introduction: Respiratory symptoms associated with gastro-oesophageal reflux (GOR) may be due to recurrent subclinical aspiration but proving ‘cause and effect’ is problematic. Detecting pepsin in Bronchoalveolar lavage (BAL) fluid has been suggested as a marker of reflux related aspiration.
Aims: To determine if some children with respiratory symptoms i.e. asthma or chronic cough, may be exhibiting pulmonary features of extra-oesophageal reflux that had not been previously recognised.
Methods: We assessed pepsin concentrations in BAL (N=82) from 3 study groups undergoing an elective surgical procedure when their respiratory disease was rela-
tively quiescent (29 asthmatics, 27 chronic cough, 26 normal controls). A detailed respiratory and allergy history and serum [f]evels were used to classify children. Pepsin concentrations were measured using an ‘in house’ ELISA with anti-porcine pepsin antibodies.
Results: The mean age was 7.7 years (IQR 10.3 to 5.7 years). Pepsin was not detectable in the majority of samples (n=67). Although not statistically significant the chronic cough and asthmatic groups were 3 times more likely to have pepsin positive samples than normal controls (Cough: Odds ratio = 3.0 and Asthma: Odds ratio = 3.14). Of those in whom pepsin was detected the concentration was higher in the cough group compared to the asthmatic group (Cough: mean = 79.0 nm/ml and Asthma = 5.13 nm/ml).
Conclusion: We found that a small number of asthmatic children and more chronic cough children may have respiratory symptoms that may be secondary to subclinical pulmonary aspiration.
E4264 Measurement of exhaled nitric oxide in school-age children in rural areas – the GABRIEL advanced surveys
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Background: Data on the fraction of exhaled NO (FeNO) in children at school-age from rural areas is limited. The studies used in rural areas are rare and the effect of farming on FeNO is unknown.
Methods: The GABRIEL Advanced Surveys Phase III are performed in a nested stratified subsample of Bavarian children aged 7-12 years participating in the cross-sectional GABRIEL Advanced Surveys. We defined nine strata based on gender (female, male, atopy and to atopy) and exposure to farming in enriched informative cases. In total, n=858 children were invited to participate in FeNO measurements. We used weighted regression analysis adjusting for sex, age, and parental smoking.
Results: Based on current statistical power, three technically satisfactory FeNO measure-
ments were performed in 782 (91%) children. For 45 children there were only two and for 6 children there was only one satisfactory measurement. After exclusion of children with high variability across repeated measurements, FeNO levels were available for 743 (87%) children with a median of 14.5 ppb (interquartile range 10.7-20.6). FeNO levels were significantly higher in asthmatics compared to non-asthmatics (mean 24.3 vs. 17.3 ppb, p<0.001) and significantly lower in farmers vs. unexposed non-farmers (mean 16.7 vs. 19.1 ppb, p=0.016). The latter effect was confirmed in the non-asthmatic study population (n=332, mean 15.4 vs. 18.0 ppb, p=0.010). These results were robust against effects of parental smoking and recent respiratory illness in the child.
Conclusions: Higher FeNO levels in asthmatics can be expected and were repli-
cated in this population-based cohort. In addition, there is evidence for lower FeNO levels in children exposed to farming, even among non-asthmatics.
E4265 The influence of farming on lung function in school-age children – the GABRIEL advanced surveys
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Background: In contrast to its protective effect on atopy and asthma in children, the influence of farming on lung function at school-age is yet unknown. Thus, we determined if farm exposure affects lung function in n=834 children 7-12 years of age, participating in the GABRIEL Advanced Surveys.
Results: The GABRIEL Advanced Surveys are cross-sectional surveys in alpine areas of Germany, Austria and Switzerland as well as Poland. In Phase III, lung function was measured by spirometry including bronchodilation in a nested stratified disproportionate subsample. This consisted of asthmatic (n=282), atopic non-asthmatic (n=278), and non-atopic non-asthmatic (n=274) children in three exposure strata: (i) farmers, (ii) non-farmers with farming exposure, and (iii) unexposed non-farmers. We used weighted multivariable regression analysis to assess a potential effect of farming on the measured parameters after adjusting for sex, age, and objectively measured body weight and body length.
Results: Based on current standards, acceptable spirometry results before and after bronchodilation were achieved in 711 and 652 children, respectively, with equal distribution among strata. Before bronchodilation, mean differences (95%CI) of non-asthmatics compared to asthmatics in the total sample were 0.25 (0.130.38) L for FEV1, 0.03 (0.006.06) L for FVC, 0.07 (0.010.13) L for FEV1/FVC. Compared to asthmatic non-farmers, atopic farmers had higher mean differences for FEV1 with 0.24 (0.030.44) L and FVC with 0.21 (0.06.37) L.
Conclusions: In addition to its protective effect on the atopy and asthma, farming may also have a positive influence on lung function in asthmatic children.
E4266 The nature of adolescent rhinitis
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Background: Adolescent rhinitis is often seen as a common but mild problem. However, its true natural history and morbidity is unclear.
Aims: To define the natural history and burden of adolescent rhinitis.
Methods: A Whole Population Birth Cohort (n=1456) was created on the Isle of Wight, UK, in 1989 and seen at 1, 2, 4, 10 & 18 yrs. Tests at 10 & 18 included ISAAC questions and skin testing (SPIT). Current rhinitis was defined as “nasal symptoms without cold or flu in the past 12 months”.
Results: Current rhinitis prevalence rose from 18.6% to 10 yrs to 35.6% at 18-31 yrs. Most (49.2%; 267/543) adolescent rhinitis began after age 10 (adolescent onset rhinitis; AOR, 31.3% (170) was present at age 10 & 18 yrs (persistent adolescent rhinitis; PAR) and 19.5% (106) remitted after 10-yr (outgrown rhinitis; OR). Sea-
sional disease dominated in these groups. AOR, PAR and OR were all significantly higher at 10 & 18 than “no adolescent rhinitis” (p<0.001). Persistent rhinitis was associated with atopy [PAR atopic at 10 (68.5%) and 18 (78.7%) respectively.
Results: Males were twice as likely to be atopic, OR 2.35 (1.7, 3.18) p-value <0.001. Male sex was independently associated with half the odds of BHR, OR 0.46 (0.32, 0.66) p-value <0.001. With each 1% increase in FEV1% the odds of BHR was reduced by 5%. Both atopy and smoking exposure approximately doubled the odds of BHR.

Conclusion: Male sex is a major independent factor that reduces BHR.

E4269
Advantage males; inverse association of serum testosterone and bronchial hyper-responsiveness

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Background: Striking reductions in bronchial hyper-responsiveness (BHR) occur with advancing pubertal stages which could be explained by increasing male sex hormonal concentrations.

Aim: To test the hypothesis that higher serum testosterone is associated with a lower risk of BHR in young adult males.

Methods: A population cohort of 321 males, first studied in childhood were reassessed at age 20 yrs (SD 1); methacholine PC20, FEV1%, history of active smoking, allergy skin testing with serum testosterone concentrations.

Results: Tertiles of serum testosterone were negatively associated with BHR. An independent dose-related association was confirmed on multivariate logistic regression with the highest tertile of testosterone associated with a 50% lower risk of BHR.

Figure 1: Tertiles of serum testosterone concentrations in relation to provocative concentrations of methacholine. PC20: Provocative concentration of methacholine leading to a 20% fall in FEV1.

Serum testosterone in relation to BHR (PC20 < 8 mg/ml methacholine)

<table>
<thead>
<tr>
<th>OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum testosterone tertiles</td>
<td>1</td>
</tr>
<tr>
<td>Lowest</td>
<td>0.63 (0.33, 1.20)</td>
</tr>
<tr>
<td>Highest</td>
<td>0.48 (0.25, 0.92)</td>
</tr>
<tr>
<td>FEV1%</td>
<td>0.95 (0.93, 0.98)</td>
</tr>
<tr>
<td>≥ 1 skin test +</td>
<td>3.54 (2.06, 6.10)</td>
</tr>
<tr>
<td>History of active smoking</td>
<td>2.16 (1.25, 3.72)</td>
</tr>
</tbody>
</table>

Conclusion: The negative association of testosterone and BHR is a novel finding relevant to the reversal from male to female predominance of BHR in the second decade of life and opens new avenues of mechanistic enquiry.


E4270
Phenotypic predictors for the persistence of asthma from childhood to adulthood in the EGEA study

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There are different factors associated with persistence of asthma from childhood to adulthood. Recently an asthma symptom score has been shown to be prognostic for asthma persistence in adults. The aim of this study was to determine the role of personal and phenotypic characteristics on asthma evolution in children followed up in the Epidemiological study on Genetics and Environment of asthma (EGEA) (follow-up rate 89.8%, mean follow-up time 11.5 yrs).

The analysis was conducted on 240 children with active asthma (asthma attacks or treatment for asthma in the past year) at EGEA1 and followed up at EGEA2 (mean age at baseline 10.8 yrs). Remission at follow-up was defined as no asthma
attacks and no asthma treatment in the past year. Potential determinants at base-
line were age, sex, BMI, sensitization to indoor allergens, allergic rhinitis, total
IgE, blood eosinophils, age at asthma onset, asthma attack frequency, treatment,
hospitalisation, FEV1% pred. In addition an asthma symptoms score (ASS) (sum
of the positive answers to 5 questions on asthma symptoms) was analysed.
At follow-up 44.2% of the sample was in remission. In univariate analyses, total
IgE, age at asthma onset <5years, asthma attacks frequency ≥1/month and ASS
≥3 were associated with persistent asthma. Multivariate logistic regression analysis
showed that a one log10 increase in total IgE, asthma attacks ≥1/month and ASS
≥3 remained independently associated with persistent asthma (OR [95% IC] were
1.95 [1.03-3.68], 2.15 [1.10-4.18] and 2.52 [1.27-5.02] respectively).
As suggested in adults, a simple asthma symptoms score seems to be an independent
predictor of asthma persistence from childhood to adulthood.