Mean number of Corticosteroids Inhalers purchased by a patient* every year



Asthma hospitalization rate in 15-24 year-old males decreased from 5.2 to 3.2 per 10,000 hospitalizations. A significant increase in annual CSI sales rates and a decrease in NO_2 and SO_2 air concentrations were noted.

Conclusions: Prevalence of persistent asthma in Israeli 17 year-old boys decreased significantly over the last decade. Some of this decrease may be attributed to an increase use of CSI and a decrease in air pollution.

P313

Rare alpha-1 antitrypsin mutations in the Irish population

Tomas Carroll¹, Catherine O'Connor¹, Geraldine O'Brien¹, Kevin Molloy¹, Ilaria Ferrarotti², Maurizio Luisetti², Shane O'Neill¹, Gerry McElvaney¹. ¹Respiratory Research Division, Department of Medicine, Royal College of Surgeons in Ireland, Dublin, Ireland; ²Department of Biochemistry and Clinical Genetics, University of Pavia, Pavia, Italy

AAT deficiency (AATD) results from mutations in the SERPINA1 gene, classically presenting with early-onset emphysema and liver disease. The most common mutation causing AATD is the Z mutation, with the S mutation weakly associated with lung disease. AAT deficiency is under-diagnosed and prolonged delays in diagnosis are common. ATS/ERS guidelines advocate screening all COPD, poorlycontrolled asthma, and cryptogenic liver disease patients, as well as first degree relatives of known AATD patients.

5,000 individuals were screened following ATS/ERS guidelines as part of the Irish national targeted detection programme. AAT levels were determined by nephelometry. AAT phenotyping was performed by isoelectric focussing. Patient DNA isolated from DBS samples was genotyped by PCR (Roche LightCycler). Rare and novel mutations were identified by DNA sequencing of the SERPINA1 gene. A number of rare SERPINA1 mutations including I, V, F, Xchristchurch, Zbristol, and Mmalton were identified. The I mutation (Arg39Cys) was present at a relatively high frequency (0.0038) in a targeted population, with over 40 cases identified. In addition, a new SERPINA1 mutation was identified.

Current testing of suspected AATD cases is often limited and can miss rare and novel clinically significant SERPINA1 mutations. The rare mutations described in this study were not detected by a commonly used genotyping assay, however, the low AAT levels prompted their correct identification using more detailed genetic analysis. Our findings underline the need for a comprehensive diagnostic work up of all patients with low AAT levels including phenotyping, genotyping and if necessary, DNA sequencing of the SERPINA1 gene.

P314

Hedgehog-interacting protein (HHIP) polymorphisms and chronic obstructive pulmonary disease (COPD)

Simona E. Budulac¹, Dirkje S. Postma², Pieter S. Hiemstra³, Thérèse S. Lapperre³, Judith M. Vonk¹, Wim Timens⁴, Henriette A. Smit⁵, H. Marike Boezen¹. ¹Epidemiology, University Medical Center Groningen, Groningen, Netherlands; ²Pulmonology, University Medical Center Groningen, Groningen, Netherlands; ³Pulmonology, Leiden University Medical Center, Leiden, Zuid-Holland, Netherlands; ⁵Pathology, University Medical Center Groningen, Groningen, Netherlands; ⁵Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, Netherlands

Genome wide association studies (GWAs) have identified single nucleotide polymorphisms (SNPs) in the region of *Hedgehog interacting protein* (*HHIP*) to be associated with COPD, level of lung function and height in the general population. We aim to investigate the association of rs1032295 and rs13147758 with lung function level and decline in subjects from the general population, as well as the association with lung function level and decline and small airways function in subjects with established COPD.

Two SNPs rs1032295 and rs13147758 in the *HHIP* region were genotyped in 1,152 subjects from the general population (Doetinchem) and 110 COPD patients (GLUCOLD). Associations of the SNPs with lung function level and small airways function (FEV₁ and FEF25-75%) at baseline were analyzed using linear regression.

54. Genetic and environmental risk factors for respiratory diseases

P312

Late-breaking abstract: The forgotten majority: A decrease in persistent but not in intermittent asthma in a large cohort study

Shlomo Cohen¹, Elie Picard², Neville Berkman¹, Chaim Springer¹, Avraham Avital¹. ¹Institute of Pulmonology, Hadassah University Medical Center, Jerusalem, Israel; ²Institute of Pulmonology, Shaare Zedek Medical Center, Jerusalem, Israel

Aim: To evaluate asthma prevalence and severity in Israeli teenage boys over the last decade.

Methods: A representative sample of three hundred thousand medical records of 17year-old boys, who underwent a comprehensive medical evaluation for eligibility for national service between 1999 and 2008,were reviewed regarding asthma diagnosis and severity. Also monitored in this period were asthma hospitalization rate, corticosteroids inhalers (CSI) sales rates and air pollution in central cities.

Results: Lifetime asthma prevalence decreased from 9.69% to 8.12%. Mild persistent asthma prevalence decreased from 3.4% to 2.4% and moderate to severe asthma from 0.9% to 0.4%. Intermittent (3.5%) and inactive asthma (2%) remained stable.



For the longitudinal analyses of the same parameters we used linear mixed-effect models.

Within smokers from the general population individuals homozygote for rs13147758 had a significantly higher FEV_1 level compared to wild-type in-dividuals B (95%CI) = 163.4 ml (14.7-312.1). COPD patients heterozygote for rs13147758 had significantly smaller FEV1 decline, i.e. 2.7 ml/yr (0.7-4.8) less decline, than wild-type individuals. None of the SNPs was significantly associated with FEF25-75% level or decline.

This study suggests that rs13147758 in the HHIP region is associated with the maximum achieved lung function level in the general population but not with lung function decline. Moreover, SNPs in the HHIP region associated significantly with less lung function decline in individuals with established COPD patients, suggesting a possible protective effect of the gene in COPD patients.

P315

Low-fat yoghurt intake in pregnancy associated with increased child asthma

and allergic rhinitis risk: A prospective cohort study Ekaterina Maslova^{1,2}, Thorhallur I. Halldorsson^{3,4}, Marin Strom³, Sjurdur F. Olsen^{1,3}. ¹Department of Nutrition, Harvard School of Public Haalth, Boston, MA, United States; ³Department of Epidemiology, Harvard School of Public Haalth, Boston, MA, United States; ³Maternal Nutrition Group, Centre for Fetal Programming, Statens Serum Institute, Copenhagen, Denmark; ⁴Unit for Nutrition Research, Faculty of Food Science and Nutrition, School of Health Sciences, University of Iceland, Reykjavik, Iceland

Background: Dairy products are important sources of micronutrients, fatty acids, and probiotics that could modify the risk of child asthma and allergy development. Objective: To examine associations of dairy intake during pregnancy with child asthma and allergic rhinitis (AR) at 7 years in the Danish National Birth Cohort. Methods: Data on milk and yoghurt consumption was collected in mid-pregnancy using a validated FFQ (N=61,912). We assessed asthma and AR through questionnaires and registry linkages. Current asthma was defined as self-reported asthma diagnosis and wheeze in the past 12 months. We conducted multiple logistic regression and report here odds ratios with 95% CI.

Results: At 7 years 5.9% (N=2,316/39,059) of children had registered lifetime asthma diagnosis and 4.2% (N=1,574/37,347) reported current asthma. Life-time AR diagnosis was 0.5% (N=191/39,059) using the registry and 4.9% (N=1,887/38,763) by self-report. Total milk intake was inversely related to current asthma risk (>5glasses/d vs. 0glasses/d: 0.78, 95% CI: 0.61, 0.98). For yoghurt, children of women who ate low-fat yoghurt (with fruit) >=1time/day had 1.61 (95% CI: 1.22, 2.12) greater odds of a registry-based asthma diagnosis compared to children of women reporting no intake. They were also more likely to have a registry-based AR diagnosis (2.82, 95% CI: 1.44, 5.53) and to report current asthma (1.62, 95% CI: 1.17, 2.24).

Conclusion: Low-fat yoghurt intake was directly related to increased risk of both child asthma and AR, while total milk intake appeared to be protective. Non-fat related nutrient components in yoghurt may be mediating this increase in risk.

P316

Heritability of atopic dermatitis: Population study and systematic review Vibeke Naeser¹, Kirsten Ohm Kyvik², Axel Skytthe³, Vibeke Backer¹, Simon Francis Thomsen¹. ¹Department of Respiratory Medicine, Bispebjerg Hospital, Copenhagen, Denmark; ²Institute of Regional Health Services Research & Odense Patient Data Explorative Network, University of Southern Denmark, ³The Danish Twin Registry, University of Southern Denmark, Odense, Denmark

Aim: We studied the relative influence of genetic and environmental factors on the variation in susceptibility to atopic dermatitis and conducted a systematic review of the related literature.

Methods: In a population-based questionnaire study of 19,748 child and adolescent twins from the Danish Twin Registry, we calculated concordance rates and heritability of atopic dermatitis. We performed a systematic review of the literature to obtain thorough estimates of the heritability of the disease.

Results: The overall prevalence of atopic dermatitis in the population was 17.8% among girls and 14.7% among boys, p<0.001. The concordance rate for atopic dermatitis was significantly higher in monozygotic than in dizygotic twins; 0.80 vs. 0.41 among girls and 0.74 vs. 0.37 among boys. The overall heritability of atopic dermatitis was the same in boys and girls; 93% (90-94%) with the remainder of the phenotypic variance ascribable to non-shared environmental factors.

Conclusions: Atopic dermatitis is a highly heritable disorder. Compared with estimates from systematically identified studies the heritability of atopic dermatitis in the Danish population is substantial.

P317

Remission of childhood asthma in adolescence - A longitudinal study Martin Andersson^{1,2}, Linnea Hedman¹, Sigrid Sundberg¹, Anders Bjerg Bertil Forsberg², Eva Rönmark^{1,2}, ¹Norrbotten County Council, The OLIN Studies, Luleå, Sweden; ²Public Health and Clinical Medicine, Umeå University, Occupational and Environmental Medicine, Umeå, Sweden

Background: Few population-based studies have prospectively evaluated remission of childhood asthma and factors related to remission.

Aims: To investigate remission and determinants of asthma remission from the age of 7-8 years to 19.

Methods: In 1996, a questionnaire about asthma and related conditions was distributed to all children 7-8 years old in three municipalities in Northern Sweden, and 3430 (97%) participated. After a validation study, 248 (7.2%) of the children were defined as having current asthma. The 248 children were reassessed by annual questionnaires until the age of 19 years where 205 (83%) participated. During the follow-up period spirometry, bronchial challenge testing and skin prick tests were performed

Results: At the age of 19 years, 76 out of the 205 participants (37%) were in remission defined as no wheeze and no use of asthma medication during the last 12 months. A negative skin prick test at age 7-8y and male sex were significant predictors for remission, OR 2.1 (CI 95% 1.1-4.2) and 2.3 (CI 95% 1.2-4.1), respectively. Having rhinitis or eczema at age 7-8 years was negatively associated with remission. Neither heredity for asthma nor parental smoking or rural living was associated with remission.

Conclusion: Remission of childhood asthma in late teenage was common and related to absence of allergic sensitization and other allergic diseases. The higher rate of remission among boys contribute to the switch in boy-to-girl prevalence ratio, from asthma being more common among boys in childhood to being more common among girls/women later in life.

P318

In-depth analysis of time trends in adult asthma and rhinitis

Anders Bjerg¹, Linda Ekerljung², Roelinde Middelveld³, Sven-Erik Dalén³, Bertil Forsberg⁴, Karl Franklin⁵, Kjell Larsson⁶, Jan Lötvall², Inga-Sif Olafsdottir⁷, Kjell Torén⁷, Bo Lundbäck², Christer Janson⁸. ¹The OLIN Studies, Dept of Medicine, Sunderby Central Hospital of Norrbotten, Luleå, Sweden; ²Krefting Research Centre, University of Gothenburg, Göteborg Sweden; ³Centre for Allergy Research and Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden; ⁴Environmental and Occupational Medicine, Umeå University, Umeå, Sweden; ⁵Dept of Surgery, Umeå University, Umeå, Sweden; ⁶Lung and Allergy Research, Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden; ⁷Occupational and Environmental Medicine, University of Gothenburg, Göteborg, Sweden; ⁸Dept of Medical Sciences: Respiratory Medicine and Allergology, Uppsala University, Uppsala, Sweden

Introduction: Lower airway symptoms (LAS) are closely related to rhinitis. In Sweden 1990-2008 the prevalence of LAS was unchanged, while rhinitis increased from 22% to 28%, leading to the hypothesis that their association had changed. The aim of this study was to characterize the relationship between rhinitis and LAS over time.

Methods: In 1990 10,345 (86% participation) Swedish adults aged 20-44 participated in the ECRHS study. In 2008 the same questions were completed by 26,527 (60% participation) Swedish adults in the GA2LEN study. Of these, the 9,637 subjects aged 20-44 and living in the areas surveyed both years were compared to the 1990 data.

Results: The prevalence of rhinitis was linearly related to the number of LAS, and all LAS were associated with rhinitis. From 1990 to 2008 any wheeze decreased in subjects with (36%-30%) and without rhinitis (16%-10%), each p<0.001. Most other LAS decreased in subjects with rhinitis, also when trends were adjusted for age, sex and area. Adjustment for smoking however dissipated all negative time trends except any wheeze, OR 0.86 (0.76-0.98). In never-smokers, the associations of rhinitis with any wheeze, asthma-related symptoms and current asthma were unchanged at OR 4, OR 6 and OR 8-10 (all p>0.2). Current smoking decreased from 35% to 12%, p<0.001.

Discussion: All LAS were positively associated with rhinitis, although at very different magnitudes. The different time trends in rhinitis and LAS were not explained by a decreased strength of association. This points towards other causative factors. One plausible explanation is that the large decrease in smoking and the increase in rhinitis cancelled each other out, thus resulting in a level prevalence of lower airway symptoms.

P319

Intake of alcohol and risk of adult-onset asthma

Sofie Lieberoth¹, Vibeke Backer¹, Kirsten Ohm Kyvik², Allan Linneberg³, Simon Francis Thomsen⁴. ¹Department of Respiratory Medicine, Bispebjerg Hospital, Copenhagen, Denmark; ²Institute of Regional Health Services Research & Odense Patient Data Explorative Network, University of Southern Denmark, Odense, Denmark; ³Research Centre for Prevention and Health, Glostrup Hospital, Copenhagen, Denmark; ⁴Department of Dermatology, Bispebjerg Hospital, Copenhagen, Denmark

Aim: To examine the association between intake of alcohol and risk of adult-onset asthma

Methods: Using data from two multidisciplinary questionnaire surveys we prospectively studied 19,349 twins, 12-41 years of age, enrolled in the nationwide Danish Twin Registry.

Results: The eight-year incidence of asthma was 4.3%. After adjustment for sex, age, BMI, educational level and smoking the risk of new-onset asthma was significantly related to alcohol intake in a U-shaped manner with the lowest risk observed in the group with a moderate weekly intake of alcohol, p=0.02. The highest risk

of asthma was observed in rare/never drinkers, OR=1.45 (1.17-1.82), p=0.001, whereas the risk of asthma in heavy daily drinkers was also increased, however not statistically significant, OR=1.26 (0.63-2.50), p=0.514. After adjustment for overall intake of alcohol, preference for beer drinking was associated with an increased risk of asthma compared with no preference, OR=1.29 (1.03-1.61), p=0.01. Conclusions: Alcohol intake appears to increase the risk of new-onset asthma in adults with a U-shaped association between amount of alcohol intake and the risk

P320

of asthma

Aspirin-induced asthma is strongly associated with obesity: Large population study on prevalence and risk factors

Jonas Eriksson¹, Linda Ekerljung¹, Apostolos Bossios¹, Eva Rönmark^{1,2}, Jan Lötvall¹, Bo Lundbäck^{1,2}, ¹*Krefting Research Centre, Department of Internal* Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; ²The OLIN-Studies, Department of Medicine, Sunderby Central Hospital of Norrbotten, Luleå, Sweden

Background: Population-based studies on aspirin-induced asthma are few and no comprehensive risk factor analysis for the condition has been published. We sought to investigate the prevalence and risk factors of aspirin-induced asthma in the general population.

Methods: A questionnaire on respiratory health was mailed to 30 000 randomly selected subjects aged 16-75 years in West Sweden, 29 218 could be traced and 18 087 (62%) responded. The questionnaire included questions on aspirin-induced dyspnea, asthma, respiratory symptoms and possible determinants.

Results: The prevalence of aspirin-induced asthma was 0.5%, 0.3% in men and 0.6% in women (p=0.014). The prevalence increased with increasing body mass index (BMI<20: 0.3% vs. BMI>35: 2.2%, p<0.001).



Figure 1. Prevalence of aspirin-induced asthma by body mass index.

Obesity was a strong risk factor for aspirin-induced asthma (BMI>35: OR 8.15; 95% CI 1.67-39.76). Obesity, occupational exposure to dust gases or fumes and visible mold at home were stronger risk factors for aspirin-induced asthma than for aspirin-tolerant asthma. Current smoking was a risk factor unique for aspirin-induced asthma (OR 2.70; 95% CI 1.52-4.81).

Conclusion: Aspirin-induced asthma was common in the population. Increasing body mass index increased the risk of aspirin-induced asthma in a dose-response manner. A number of risk factors including obesity were considerably stronger for aspirin-induced asthma than for aspirin-tolerant asthma

P321

Physical fitness and asthma development in a random population during three decades. The Odense schoolchild study Jørgen Guldberg-Møller¹, Finn Rasmussen^{1,2}, ¹Department of Clinical Research,

University of Southern Denmark, Odense, Denmark; ²Department of Allergy and Respiratory Medicine, Near East University Hospital, Lefcosa, Mersin, Turkey

Aim: To investigate the longitudinal association between physical fitness and the development of asthma and asthma-like symptoms in a general population sample. 1369 children from the Odense schoolchild study were assessed from 1985 to 2007 at age 9, 15, 20 and 29 years. The same physical fitness test was applied at all occasions and fitness was stratified into quintiles for each sex.

Results: The following analysis is based all subjects who performed a satisfactory fitness test: 1369 children at age 9 (mean 9.7), 1072 (78%) at age 15 (mean 15.6), 881 (64%) at age 20 (mean 20.3) and 814 (60%) at age 29 (mean 29.3) performed a satisfactory fitness test respectively. The results showed that fitness levels at each age was associated with lower lung function at same age (p<0.001). The was no significant difference in the occurrence of asthma or asthma-like symptoms in the sex specific fitness quintiles at age 9 years. Higher fitness at age 9 was associated with a lower occurrence of asthma at age 20 (p=0.001) and 29 years (p=0.04), but not significant at age 15 years. On the other hand, at age 15 there was a significant trend of higher occurrence of asthma-like symptoms the lower the fitness quintile at age 9 years (p<0.05). In the sex specific analyses the association between physical fitness at age 9 years and asthma at age 20 and 29 years was only significant in women (age 20; p=0.01); (age 29; p=0.04) and men (age 20; p=0.07); (age 29; p=0.7) respectively.

Conclusion: In conclusion, our results point toward the importance of a moderatehigh fitness level before puberty to reduce the risk of asthma development in adulthood but this effects seems mainly present in women.

P322

Impact of physical inactivity on cognitive function in adults with obstructive lung disease (OLD)

Patricia Katz, Laura Julian, Jonathan Singer, Theodore A. Omachi,

Steve Gregorich, John Balmes, Paul D. Blanc. Medicine, University of California, San Francisco, San Francisco, CA, United States

Background: OLD may increase risk of cognitive deficits.

Objective: Examine the role of physical inactivity in cognitive impairment (CI). Methods: Members of a population-based cohort with self-reported physiciandiagnosed COPD, emphysema, or chronic bronchitis (n=140; 63% female, mean age 67 yrs, 19% current smokers) completed baseline (T1) and 2-year follow-up (T2) in-person assessments that included spirometry; completion of the CHAMPS Questionnaire to estimate energy expenditure in vigorous/moderate intensity activities (M/V) and overall; and a 10-test cognitive function battery. We defined physical inactivity as no expenditure in M/V activities. We transformed cognitive test scores to age-adjusted z-scores and defined CI as z-scores ≤-1.5 on ≥33% of cognitive tests. Logistic regression tested relationships between physical inactivity and CI at both T1 and T2, controlling for sex, education, smoking, comorbid conditions, low O2 saturation, depressive symptoms, and FEV1% predicted.

Results: At T1, 31% were physically inactive. CI was more frequent among inactive subjects (27% vs. 12%; adjusting for covariates: OR=9.8 [95% CI 1.8, 53.1]). Adjusting for covariates plus T1 CI, inactive subjects were more likely to be cognitively impaired at T2 (OR=4.4 [1.2, 15.8]). Among 120 subjects not impaired at T1, inactive subjects were more likely to develop CI at T2 (26% vs. 15%; OR=6.0 [1.5, 24.1]).

Conclusion: Physical inactivity is a significant risk factor for presence and incidence of cognitive impairment among adults with OLD.

Clinical relevance: In OLD, participation in a program of even moderate physical activity may offer protection from cognitive impairment. Support: NIH R01 HL067438

P323

Decrease in smoking is related to a decrease in respiratory symptoms but not asthma

Helena Backman¹, Linnea Hedman¹, Sigrid Sundberg¹, Bo Lundbäck^{1,2}, Eva Rönmark^{1,3}. ¹*The OLIN Studies, Norrbotten County Council, Lulea, Sweden;* ²Krefting Research Center, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; ³Public Health and Clinical Medicine, Occupational and Environmental Health, Umea University, Umea, Sweden

Background: In 2005, smoking was banned in public places in Sweden.

Aim: To compare the prevalence of respiratory symptoms and asthma among adults in 1996 and 2006 by smoking habits.

Methods: In 1996, 7104 randomly selected subjects (response rate 85%) in Northern Sweden aged 20-69 answered a postal questionnaire including questions about respiratory diseases, symptoms and smoking habits. Correspondingly, in 2006 a new sample of 6165 subjects (77% responded) of same age answered the same questionnaire.

Results: All respiratory symptoms were strongly related to smoking. The prevalence of most respiratory symptoms decreased significantly from 1996 to 2006 parallel to a decrease in smoking, which decreased from 27 to19%. The prevalence of sputum production decreased from 19.1 to 15.0%, longstanding cough 12.4-10.8%, chronic bronchitis 7.4-6.3%, and recurrent wheeze 13.4-12.1%. The prevalence of these symptoms was similar among smokers, and decreased among non-smokers. Physician-diagnosed asthma increased among both smokers and non-smokers, totally from 9.3 to 11.5%. However, the proportion of medicine users and symptomatics among the asthmatics were lower in 2006. In multivariate analysis adjusted for confounders, a significant increase of asthma by study year was found (OR 1.4). Corresponding analysis for chronic bronchitis yielded a significant decreased effect by study year (OR 0.8).

Conclusions: The decreased prevalence of respiratory symptoms was parallel to a decrease in smoking. The decrease in bronchitis symptoms among non-smokers may be related to a reduction of environmental tobacco smoke and occupational airborne exposures. Increased diagnostic activity can explain the increase in asthma.

P324

Recent trends in COPD prevalence in Italy Sonia Cerrai¹, Sara Maio¹, Giuseppe Sarno¹, Sandra Baldacci¹, Martina Fresta¹, Franca Martini¹, Anna Angino¹, Francesco Di Pede¹, Francesco Pistelli¹, Laura Carrozzi¹, Giovanni Viegi^{1,2}. ¹*Pulmonary Environmental Epidemiology* Unit, CNR Institute of Clinical Physiology (IFC), Pisa, Italy; Physiolute of Biomedicine and Molecular Immunology (IBIM) "A. Monroy", CNR, Palermo, Italv

Aim: To compare prevalence rates and risk factors associated with COPD in an Italian population sample surveyed 20 years apart.

Methods: The family cluster random sample living in Central Italy (Pisa) was enrolled in 1991-93 (n=2529, age range 20-97 yrs, males 44.4%); the survivors, with the inclusion of new family members, were studied again in 2009-10, within the framework of the European Union funded project IMCA2 (Indicators for Monitoring COPD and Asthma in EU) (n=1341, age range 20-103 yrs, male 46.5%). Lifestyle, health status and chronic respiratory diseases information were collected by questionnaire. Spirometry was also used. A Logistic Regression analysis was ran to assess the association between COPD diagnosis and risk factors.

Results: COPD diagnosis prevalence had increased from 8.2% to 11.1% over the 20 years (p=.003). In both studies, COPD diagnosis is significantly associated with 64+ yrs (IS: OR 15.8, CI 95% 7.7-32.5; IIS: OR 6.1, CI 95% 3.1-11.9) and 45-64 yrs age range (IS: OR 8.6, CI 95% 4.2-17.4; IIS: OR 2.3, CI 95% 1.1-4.8), male gender (IS: OR 2.9; CI 95% 1.9-4.5; IIS: OR 1.5, CI 95% 1.0-2.4), actual or past smoking habits (IS: OR 2.6, CI 95% 1.7-4.1; IIS: OR 1.9, CI 95% 1.2-3.0), work exposure to dust, gas or chemicals (IS: OR 2.0, CI 95% 1.4-2.9; IIS: OR 1.8, CI 95% 1.2-2.7), co-presence of asthma diagnosis (IS: OR 5.9, CI 95% 3.8-9.3; IIS: OR 4.5, CI 95% 1.5-6.6) and cardiovascular illness (IS: OR 2.3, CI 95% 1.6-3.2; IIS: OR 4.5, CI 95% 1.5-4.0).

Conclusions: COPD is still increasing in Italy. While the association with the risk factors is confirmed, there is a general decrease of the OR values over the 20 years. The OR decline for male gender is in line with the recent raise of COPD prevalence in females.

P325

COPD among non-smokers

Stig Hagstad^{1,2}, Linda Ekerljung¹, Anne Lindberg^{2,3,4}, Eva Rönnmark^{2,4}, Bo Lundbäck^{1,2}. ¹Dept. of Internal Medicine/Krefting Research Centre, Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden; ²The OLIN Studies, ³Division of Respiratory Medicine & Allergy, Sunderby Central Hospital of Norrbotten, Luleå, Sweden; ⁴Dept. of Public Health and Clinical Medicine, Umeå University, Umeå, Sweden

Background: In westernized countries including Sweden, smoking and increasing age are the most important risk factors for COPD. Prevalence and risk factors of COPD among non-smokers are not well studied.

Aim: To study the prevalence and risk factors of COPD among never smokers and to determine the proportion of never smokers among subjects with COPD.

Methods: Of 5189 postal questionnaire responders (response rate 88%) aged 46-77 years from a stratified sample of the general population of Norrbotten, Sweden, a random sample of 1500 subjects were invited to structured interviews and lung functions test, and 1237 completed a lung function test with acceptable quality. Never smokers were defined as those who had smoked <1 cigarette/day for <1 year. COPD was defined as GOLD stage \geq II, as several medical conditions are associated with a FEV1/FVC <0.7.

Results: The prevalence of COPD among non-smokers was 3.4% and tended to be more common among women than men (4% vs 2.3%, NS) and was strongly age related particularly among men. For comparison the overall prevalence in ages >45 y COPD was 8.1% (similar in men and women). Among never smokers the prevalence of severe COPD (FEV1<50% of predicted) was 0.8 (women 0.9%; men 0.6%; NS). In contrast to men, severe cases of COPD were found among women aged <65 years. Of all men with COPD, 15% were never smokers versus twice that much among women. Increasing age was a significant risk factor, while passive smoking, manual work in industry and female sex tended to be associated with COPD among never smokers.

Conclusion: The prevalence of clinically relevant COPD among never smokers aged >45 y was 3.4% and was associated with increasing age. One out of seven men with COPD versus one out of three women had never been smokers.

P326

BMI and risk for death in COPD

Berne Eriksson^{1,2}, Eva Rönmark^{2,3}, Anne Lindberg^{2,3}, Hana Müllerova⁴, Bo Lundbäck^{1,2}. ¹Department of Internal Medicine/Respiratory Medicine and Allergology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; ²The OLIN Studies, Sunderby Central Hospital of Norrbotten, Luleå, Sweden; ³Department of Public Health and Clinical Medicine/Occupational and Environmental Medicine, University of Umeå, Umeå, Sweden; ⁴World Wide Epidemiology, GlaxoSmithKline, Greenford, United Kingdom

Background: Low BMI in COPD is associated with a poor prognosis in clinical settings although nutritional support shows no effect on improving anthropometric measures, lung function, or functional exercise capacity among patients with stable COPD.

Aim: To study the long-term outcome of BMI-levels in a cohort of COPD subjects derived from a study of the general population.

Methods: A stratified sample of subjects from a population survey was invited to clinical examinations including lung function tests in 1986. Out of 1506 (91% of the invited) we identified 266 subjects, 64% men, fulfilling the spirometric GOLD criteria of COPD. The subjects with COPD reflected well COPD in the society. The subjects were followed-up to 20 years or until death. Risks for death of these subjects were determined by survival analysis (Cox regression) adjusting for baseline sex, age, heart disease, smoking habits and BMI.

Here a statistic in the state of the theorem in the state of the stat

Conclusion: Mortality in COPD seems to be associated with heart disease where overweight is a risk factor. In a long-term perspective, low BMI was not associated with increased mortality.

P327

Cured meats consumption increases risk of readmission in COPD patients Jordi De Batlle¹, Michelle Mendez¹, Isabelle Romieu², Eva Balcells³, Marta Benet¹, David Donaire-Gonzalez¹, Jaume J. Ferrer⁴

Marta Benet¹, David Donaire-Gonzalez¹, Jaume J. Ferrer⁴, Mauricio Orozco-Levi³, Josep M. Anto¹, Judith Garcia-Aymerich¹. ¹Centre for Research in Environmental Epidemiology (CREAL), IMIM, CIBERESP, UPF, Barcelona, Spain; ²International Agency for Research on Cancer, IARC, Lyon, France; ³Pneumology, Hospital del Mar, Barcelona, Spain; ⁴Pneumology, Hospital Vall d'Hebron, Barcelona, Spain

Rationale: Recent studies have shown that a high dietary intake of cured meat increases the risk of COPD development. However, its potential effects on COPD evolution have not been tested.

Objective: To assess the association between dietary intake of cured meat and risk of COPD readmission in COPD patients.

Methods: 274 COPD patients were recruited during their first COPD admission between 2004 and 2006, provided information on dietary intake of cured meat during the previous 2 years, and were followed through December 31st 2007 (median follow-up 2.6 years). Associations between cured meat intake and COPD admissions were assessed using parametric regression survival-time models.

Measurements and main results: Mean (SD) age was 68 (8) years, 93% of patients were males, 42% were current smokers, mean post-bronchodilator FEV1 was 53 (16)% predicted, and median cured meat intake was 23g/day. After adjusting for age, FEV1, and total caloric intake, high cured meat intake (> median value) increased the risk of COPD readmission (adjusted Hazard Ratio (95% confidence interval) 2.02 (1.31 - 3.12), p=0.001). Smoking and socioeconomic status were not included in final models because they did not relate to cured meats consumption.



Conclusions: High cured meat consumption increases the risk of COPD readmission in COPD patients, which suggests potential public health benefits from recommending dietary shifts to reduce intakes of these foods in COPD patients.

P328

Professional exposure to goats increases the risk of pneumonic-type lung adenocarcinoma. Results of the IFCT-0504-epidemio study

Girard Nicolas, Delphine Magnin Lutringer, Jacques Cadranel, Caroline Leroux, Elisabeth Quoix, Vincent Cottin, Delphine Del Signore, Marie Paule Lebiasy, Geneviève Cordier, Philippe Vanhems, Jean-François Mornex. UMR754 "Retrovirus and Comparative Pathology", INRA, University Lyon 1, Lyon, France Respiratory Medicine Department, Louis Pradel Hospital, Hospices Civils de Lyon, Lyon, France Respiratory Medicine Department, Tenon Hospital, Assistance Publique Hôpitaux de Paris, France, France Respiratory Medicine Department, Hautepierre Hospital, Hôpitaux Universitaires de Strasbourg, Strasbourg, France UMR 5558 "Retrovirus and Comparative Pathology", CNRS, University Lyon 1, Lyon, France

Background: Pneumonic-type lung adenocarcinoma (P-ADC) represents a distinct subset of lung cancer with specific clinical, radiological, and pathological features. Given the weak association with tobacco-smoking and the striking similarities with JSRV-induced ovine pulmonary adenocarcinoma, it has often been suggested that a viral agent infecting pulmonary cells may predispose to P-ADC in humans. Aims and objectives: Our objective was to explore whether exposure to domestic ungulates may represent a risk factor for P-ADC.

Methods: We performed an exploratory multicenter case-control study recruiting patients with P-ADC as cases and patients with non-P-ADC non-bronchioloalveolar non-small cell lung cancer as controls. A dedicated 356-item questionnaire was built to evaluate domestic ungulates exposure. A total of 44 cases and 132 controls were included.

Results: At multivariate analysis, P-ADC was significantly associated with female gender (Odds-ratio (OR)=3.23, 95% confidence interval (CI): 1.32-7.87, p=0.010), never- smoker status (OR=3.57, 95% CI: 1.27-10.00, p=0.015), personal history of

any cancer (OR=3.43, 95% CI: 1.10-10.72, p = 0.034), and professional exposure to goats (OR=5.09, 95% CI: 1.05-24.69, p = 0.043). **Conclusions:** This exploratory case-control suggests a link between professional exposure to goats and P-ADC, and prompts for further epidemiological evaluation of potential environmental risk factors for P-ADC.