P1013
Late-breaking abstract: A prospective study of central obesity, overall obesity and incident asthma in adults
Ben Brumpton1, Arnulf Langhammer1, Pål Romundstad1, Yue Chen2, Xiao-Mei Mai1. 1Department of Public Health and General Practice, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway; 2Department of Epidemiology and Community Medicine, Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada

Introduction: Measures of body mass index (BMI) and waist circumference (WC) define overall obesity and central obesity respectively. While high BMI has been established as a risk factor for asthma in adults, WC has seldom been investigated.

Aims and objectives: We conducted a prospective cohort study to investigate the individual and combined effect of central obesity and overall obesity on adult incident asthma.

Methods: A total of 23,245 adults without asthma, 19–55 years of age from the second Norwegian Nord-Trøndelag Health Study (HUNT), were followed for 11 years. WC and BMI were measured and categorised as central obesity (WC ≥88cm in women and ≥102cm in men) and overall obesity (BMI ≥30.0 kg/m2).

Incident asthma was self reported asthma during the follow up. Odds ratios (OR) were calculated by logistic regression models adjusted for age, smoking status, education, family history, physical activity, social benefit, economical difficulty and sex.

Results: Of the 23,245 adults in the analysis, 12% (n=2,792) were overall obese, 13.6% (n=3,170) were centrally obese at baseline and 3.5% (n=818) had asthma during the 11-year at follow up. Central obesity in the absence of overall obesity was significantly associated with incident asthma (OR 1.44, 95% confidence interval (CI) 1.09-1.91). The OR for overall obesity in the absence of central obesity was 1.38 (95% CI 0.96-2.00), similar to central obesity alone. Central obesity combined with overall obesity (OR 1.81, 95% CI 1.48-2.23) is compatible with an additive effect of BMI and WC on asthma.

Conclusion: Central obesity and overall obesity seem to have an individual effect on incident asthma in adults and an additive effect when in combination.

P1014
Trends in co-morbidity in oxygen-dependent COPD
Magnus Ekström1, Claes Jogreus2, Kerstin Ström1. 1Department of Internal Medicine, Blekinge Hospital, Karlskrona, Sweden; 2Department of Mathematical Science, Blekinge Institute of Technology, Karlskrona, Sweden

In recent decades, mortality from non-respiratory diseases has increased in patients on long-term oxygen therapy (LTOT) for COPD (Ekström, M.P. et al. AJRCCM. Epub 2011 Jan 7). This study tests the hypothesis that co-morbidity has increased over time in oxygen-dependent COPD.

Material and methods: Patients starting LTOT for COPD between 1 January 1992 and 31 December 2008 in the national Swedish Oxygen Register were included. All registered diagnoses within five years prior to initiating LTOT were collected retrospectively from the Swedish Hospital Discharge Register, which include about 99% of all public hospitalizations in Sweden. Odds ratios (ORs) for diagnosis entities per calendar year were estimated using logistic regression adjusted for age, sex, PaO2, breathing air, FEV1, and smoking history.

Results: 6147 patients (55% women) with a mean age 71.6 ± [SD] 8.4 years were included in the analysis. Adjusted odds ratios per calendar year (OR; 95% confidence interval (CI) 1.09-1.91). The OR for overall obesity in the absence of central obesity was 1.38 (95% CI 0.96-2.00), similar to central obesity alone. Central obesity combined with overall obesity (OR 1.81, 95% CI 1.48-2.23) is compatible with an additive effect of BMI and WC on asthma.

Conclusion: Central obesity and overall obesity seem to have an individual effect on incident asthma in adults and an additive effect when in combination.
**Purpose:** To develop a prediction model for exacerbation of COPD.

**Methods:** Data from an existing cohort of 244 patients with COPD according to the GOLD criteria were used, with a follow-up of 4.2 (SD 1.2) years. The initial assessment was between 2001 and 2003. Exacerbation of COPD was defined as a period of worsening of COPD symptoms necessitating boosts of prednisolone therapy. Univariable and multivariable logistic regression analysis was used to construct a final, reduced prediction model. After bootstrapping, c-statistics were used to estimate the ability of the model to discriminate between patients who suffered from an exacerbation and whom not.

**Results:** In total, 115 (47.1%) patients experienced at least one exacerbation and more than half (57.4%) of the patients had ≥ 2 exacerbations during the follow-up period. The final reduced model included body mass index, FEV1 (as predicted), smoking history, systemic steroid use in the year before initial assessment, use of corticosteroid inhalers, a history of stroke/TIA, and a history of ischaemic heart disease. The c-statistic after bootstrapping was 0.81 (95% CI: 0.76 – 0.86).

**Conclusions:** Variables related to severity of pulmonary obstruction, smoking history, but also a history of cardiovascular diseases were independent predictors of an exacerbation of COPD. More attention should be paid to unmask coexisting cardiovascular disease, because adequate treatment of these diseases could reduce exacerbations, but probably also mortality in patients with COPD.

**P1016**

Increased prevalence of elevated high-sensitivity cardiac troponin T among patients with stable chronic obstructive pulmonary disease

Anke Meta Christina Neukamm, Høstø Arne Didrik, Søyseth Vidar, Omland Torbjørn. Division of Medicine, Akershus University Hospital, Lørenskog, Akerhus, Norway

**Background:** Previously, we have found that cardiac troponin (cTnT) elevation is frequently seen during acute exacerbations of chronic obstructive pulmonary disease (COPD) and is associated with poor survival.

**Aims and objectives:** To assess the prevalence of elevated high-sensitivity cTnT (hs-cTnT) in stable COPD and whether hs-cTnT is associated with pulmonary function.

**Material and methods:** We performed a cross-sectional case-control study. The index group consisted of 93 stable COPD patients, and the references were 113 patients with stable chronic obstructive pulmonary disease (COPD) and is associated with poor survival.

**Results:** All participants underwent clinical investigation, spirometry, electrocardiography, and blood analysis including serum creatinine, NTpro-BNP, and hs-cTnT.

The prevalence of hs-cTnT in the categories < 3.0, 3.0-13.9 and > 14.0 ng/L was significantly different between patients and controls and is shown in the table. Using the log-transformed hs-cTnT as the dependent variable in a linear regression model, adjusting for smoking, BMI, creatinine, age, sex, race-ethnicity, smoking, cardiac disease and diabetes we found that hs-cTnT was significantly higher (p=0.007) among the patients (78.2% male, median age 71 years [IQR 63-77] with left ventricular hypertrophy) compared to controls (73.1% male, median age 70 years [IQR 59-76]).

**Conclusion:** Stable COPD is associated with increased levels of hs-cTnT.

**P1017**

Predictors of high-sensitivity cardiac troponin T during acute exacerbation of chronic obstructive pulmonary disease

Arne Didrik Høstø 1, 2, Anke Neukamm 1, 2, Tor-Arne Hagve 3, 2, Pål H. Bremke 1, 2, Torbjørn Omland 1, 2, Vidar Søyseth 1, 2, 3, 4, 5, 6, 7, Torbjørn Omland 1, 2, Vidar Søyseth 1, 2, 3, 4, 5, 6, 7.

1, 2, 3, 4, 5, 6, 7: Department of Internal Medicine, Akershus University Hospital, Lørenskog, Norway; 3, 4, 5, 6, 7: Department of Medical Biochemistry, Akershus University Hospital, Lørenskog, Norway; 7: Faculty Division, University of Oslo, Lørenskog, Norway

**Background:** A high-sensitivity cardiac troponin T (hs-cTnT) concentration above the 99th percentile (i.e. > 14 ng/L) is common during Acute Exacerbation of Chronic Obstructive Pulmonary Disease (AECOPD) and is associated with increased mortality.

**Objective:** To identify factors predictive of hs-cTnT levels during AECOPD.

**Methods:** We included 99 patients with AECOPD on admission. As several patients had repeated admissions, there are 219 observations. We recorded clinical data, medication, spirometry, chest radiographs, ECG data and biochemical data including serum creatinine, hs-cTnT, and NT-proBNP. The data were analysed using a general linear mixed model with the natural logarithm of hs-cTnT as the dependent variable.

**Results:** Mean age at inclusion was 71.5 years, mean FEV1 was 37% of predicted, and median hs-cTnT was 39.7 ng/L. The variables associated with hs-cTnT (p<0.15) in univariate analysis were: Age, gender, history of smoking, coronary artery disease, heart failure and hypertension, use of ACE inhibitors, peripheral edema, blood pressure, tachycardia, PaCO2, creatinine, neutrophil count, NT-proBNP, and infiltrate and cephalisation on chest radiograph. In a multivariable model, patient age, history of hypertension, cephalisation, tachycardia, creatinine, neutrophil count >11.5 x10⁹/L, and NT-proBNP remained significantly associated (p<0.005) with hs-cTnT.

**Conclusion:** Elevated fibrinogen values are important predictors of death and add to the predictive ability of impaired lung function to predict mortality.
patients with and without a history of obstructive lung disease (n = 58 and n = 162 respectively), we found overdiagnosis of COPD in the first group (n = 16, 27.6%) and underdiagnosis of COPD in the latter group (n = 39, 24.1%) based on spirometry.

Conclusion: COPD is a frequent co-morbidity in CHF with left ventricular systolic dysfunction, but is often unrecognized or even overdiagnosed. To avoid this and thus improve the treatment of COPD in CHF, pulmonary function tests should be routinely obtained, preferably in a stable state of heart failure.

P1020
Acute myocardial infarction is associated with increased number of bronchial macrophages in low risk patients

Vidar Søyseth1, Faiza Mahmood1, Arne Didrik Høstøl1, Arne Neukamm2, Pal Brekke1, Torgunn Waehre1, Torbjørn Omland1, Johny Kongerud2.

Joachim Heinrich1.

H.-Erich Wichmann1,7, Jürgen Behr

4,8, Rudolf Maria Huber4,9, Vidar Soyseth1, Faiza Mahmood1, Arne Didrik Høstøl1, Arne Neukamm2, Pal Brekke1, Torgunn Waehre1, Torbjørn Omland1, Johny Kongerud2.

Background: Several studies have shown that low lung function (even within normal limits) as well as respiratory symptoms are associated with increased cardiovascular mortality. In a case referent study we have compared sputum from patients hospitalised for acute myocardial infarction (AMI) with sputum from a random sample in the general population. The objective was to investigate the association between inflammatory cells in the airways and AMI.

Method: The cases (N=58, mean age 58 years) had a confirmed diagnosis of AMI and performed induced sputum within 96 hours after the onset of chest pain. The refer-

ences (N=120) were selected by random sampling from the hospital’s catchment area. Subjects aged 40–74 years (mean age 55 years) were invited to participate.

Results: Only six patients (10%) were females and 27 patients (47%) were current smokers. The corresponding prevalences in the reference group was 5% (49%) and 27 (23%), respectively. The total number (mean,SD) of sputum cells was 3.9×10^6/mL (4.2) and macrophage count was 1.1×10^5/mL (1.2) among cases, and 3.1×10^5/mL (2.8) (p=0.12) and 0.72×10^5/mL (0.69) (p=0.011) among references. The difference in total macrophage count between the cases and the references increased with declining cholesterol (p=0.028). There was also a nega-

tive association with increasing age, systolic blood pressure, and current smoking, although not significant.

Conclusion: AMI is associated with a high macrophage count in induced sputum from patients with a low cardiovascular risk profile, suggesting multifocal inflammatory activity.

P1021
High blood pressure, antihypertensive medication and lung function in a general adult population

Eva Becker1, Stefan Karrasch1,4, Holger Schulte1,4, Sven Glaser1, Christoph Bräuer1, H. Erich Wichmann1,2, Jürgen Behr4,8, Rudolf Maria Huber4,9.

Joachim Heinrich1.

H.-Erich Wichmann1,7, Jürgen Behr

4,8, Rudolf Maria Huber4,9, Eva Becker1,2, Stefan Karrasch3,4, Holger Schulz1,4, Svend Glaser5,6,10, Margit Heier6,10, Annette Peters7,10, Julia Chuyasova, Vasiliy Pyankov, Elena Poyarkova.

High blood pressure, antihypertensive medication and lung function is mainly attributable to beta-blockers.

Background: Within the population-based KORA F4 study 1319 adults aged 40-65 years performed lung function tests and blood pressure measurements. Informa-

tion on medical history and use of antihypertensive medication was available, from a collection of 14 years, 97% men

Conclusions: Our analysis indicates that both high blood pressure and antihypertensive treatment are associated with reduced lung function in a general adult population. Furthermore, we speculate that the negative effect of antihypertensive medication on lung function is mainly attributable to beta-blockers.

P1022
Prevalence of pulmonary artery hypertension and right ventricular dysfunction in COPD patients in the Kirov region of Russia

Julia Chuyasova, Vasiliy Pyankov, Elena Poyarkova.

Department of Internal Medicine, Akershus University Hospital, Lørenskog, Norway; 2 Dept of Respiratory Medicine, Oslo University Hospital, Oslo, Norway

Conclusions: The prevalence of comorbidities didn’t correlate with the severity of COPD. There was statistical correlation between Charlson index and hospital admissions due to COPD exacerbation.

P1023
Prevalence of comorbidities in patients with COPD in south-Spain

Aurelio Arnedillo1, Mercedes Merino2, Pilar Cordero2, Ismaculada Altagrave3, Jose Luis Lopez-Campos4, Bernardino Alcazar4, Francisco Casas5.

Pulmonary Medicine, Hospital U. Virgen del Rocío, Sevilla, Spain; 3Pneumology Department, Hospital U. Valme, Sevilla, Spain; 4Pneumology Department, Hospital U. San Cecilio, Granada, Spain.

Objective: The prevalence of comorbidities in COPD is variable according to different publications. Our objective was to analyse the prevalence of comorbidities in stable COPD patients in our area, and its relation to other parameters.

Material and methods: Concurrent multicenter prospective study that included stable COPD patients from 6 hospitals at the South of Spain. We obtained demographic, epidemiologic and pulmonary function test variables, Charlson and BODE index, British Medical Research Council (BMRC) Dyspnea scale, London Chest Activity of Daily Living Scale (LCADL), Hospital anxiety and depression scale (HADS) and St George’s respiratory questionnaire (SGRQ).

Results: We studied 164 patients (83.5% males), with a mean age of 65.7 years and mean FEV1 of 49.7%. According to GOLD classification, 4.9% were in Stage I, 38.4% in Stage II, 45.1% in Stage III and 11.6% in Stage IV. The prevalence of ischemic cardiopathy was 6.1%, peripheral vascular disease 8.5%, isquemic stroke 4.9%, ulcer disease 7.9%, diabetes 12.8%, neoplasms 11%, hepatic disease 10.4% and renal disease 2.4%. Using the HAD scale 14% of the patients showed anxiety symptoms, and 15.2% depression symptoms. 30% of patients have 1 comorbidity, 16.6% have 2 comorbidities and 3.7% have 3 or more. The prevalence of comorbidities didn’t correlate with the severity of COPD. There was statistical correlation between Charlson index and hospital admissions due to COPD exacerbation.

Conclusions: The prevalence of comorbidities in our patients with COPD was high compare with general population, and independent of the degree of severity. Charlson index correlated with hospitalizations due to COPD exacerbations.

P1024
The evaluation of systemic inflammation in COPD patients comorbidized with cardiovascular diseases or diabetes mellitus


Division of Respiratory Diseases, Department of Internal Medicine, Jikei University School of Medicine, Tokyo, Japan.

Conclusion: COPD is one of so-called life-style related diseases and reported to show systemic inflammation, due to strong relationship to long-time tobacco smoking. Therefore, COPD patients often have a variety of comorbid diseases, in-

181s

Abstract printing supported by Chiesi. Visit Chiesi at Stand D.30
P1026 Prevalence of anemia of chronic disease in patients with chronic obstructive pulmonary disease
Afroditi Boutou1, Georgia Pitsiou1, Ioannis Stanopoulos 1, Antônio Barbieri2, Elcio Oliveira Vianna1.
1Department of Pulmonology, Aristotle University of Thessaloniki, Thessaloniki, Greece; 2Departments of Critical Care Medicine and Intensive Care Medicine, University of São Paulo, São Paulo, Brazil

Background: Anemia of chronic disease (ACD) is a disorder occurring in subjects with chronic immune activation. Chronic Obstructive Pulmonary Disease is characterized by systemic inflammation, so it could be accompanied by ACD.

Methods: The initial study population consisted of consecutive clinically stable patients with COPD (post bronchodilation FEV1/FVC < 0.7; no exacerbation, hospitalization or change in medication in the previous 3 months), who visited their GP or pulmonary clinic. Those with asthma, heart failure, renal failure, malignancies, systemic or autoimmune diseases, chronic infections, blood loss of any kind and hemoglobin (Hb), liver or thyroid disorders were excluded. In this study, ACD was confirmed by the presence of: a) low Hb (<13 mg/dl; <12 mg/dl for females); b) ferritin (30 mg/dl; c) total binding iron capacity (<250 mg/dl; and d) transferrin saturation 15-43%.

Results: The prevalence of ACD in males was 47.3% and in females was 22.6% (chi2 = 14.38, p = 0.0002) and the adjusted odds ratio for ACD was 3.5 (95%CI= 2.3-5.2). In the study sample, ACD was associated with COPD severity and increased with severity of disease in the patients with COPD.
This was a cross-sectional analysis of 1922 men and women. Subjects completed a translated questionnaire from the European Community Respiratory Health Survey and underwent spirometry and a bronchial challenge test. Weight, height and waist circumference were measured. Multiple logistic regression analysis was carried out to assess the association of variables related to obesity and asthma, defined by the presence of symptoms and bronchial hyperresponsiveness (BHR). A self-report of a previous physician diagnosis of asthma was separately analyzed as also were socioeconomic characteristics, schooling, physical activity, smoking status, anthropometry and spirometry.

No association was detected between asthma confirmed by BHR and obesity indicators: odds ratio (OR)= 1.076 (95% CI: 0.689 - 1.680) for obesity assessed by body mass index $\geq 30$ kg/m$^2$; OR = 0.947 (95% CI: 0.686-1.308) by abnormal waist circumference and OR = 1.019 (95% CI: 0.740-1.404) by waist-to-height ratio $\geq 0.5$. A previous diagnosis of asthma revealed association with obesity: OR = 1.480 (95% CI: 1.014-2.161) for obesity assessed by body mass index $\geq 30$ kg/m$^2$; OR = 1.413 (95% CI: 1.084-1.841) by abnormal waist circumference and OR = 1.477 (95% CI: 1.133-1.926) by waist-to-height ratio $\geq 0.5$.

Our findings did not support a connection between asthma confirmed by BHR and obesity, but obesity was associated with self-report of a previous physician diagnosis of asthma.

Effects of psychiatric comorbidity on respiratory drugs and health care utilization

Sandra Baldacci1, Sara Maio1, Giuseppe Sarno1, Anna Angino1, Sonia Cerrai1, Franca Martini1, Martina Fresta1, Francesco Di Pede1, Giovanni Viegi1,2

1Pulmonary Environmental Epidemiology Unit, CNR Institute of Clinical Physiology, Pisa, Italy; 2CNR, Institute of Biomedicine and Molecular Immunology “A. Monroy”, Palermo, Italy

Background: Psychiatric disorders are significant comorbid conditions in chronic obstructive pulmonary disease (COPD), however their effects on respiratory health care costs are still debated.

Aim: To investigate the relationship between psychiatric comorbidity and respiratory health care costs in an epidemiological survey.

Methods: 1354 subjects (mean age: 58.0yrs ± 18.0; 45.3% males) living in Pisa (Central Italy) participated in a cross-sectional study (2009-11) within the IMCA2 (Indicators for Monitoring COPD and Asthma in the EU) project. An interviewer administered questionnaire on socio-demographic characteristics, respiratory symptoms/diseases, cardiovascular diseases (CVD), risk factors and the Hospital Anxiety and Depression Scale were used. Logistic regression analyses, adjusted for smoking habits, age, sex, CVD, were used to evaluate association between respiratory drug, health care utilization and asthma/COPD with (AC+AD) or without anxiety/depression (AC); anxiety/depression without asthma/COPD (AD); neither anxiety/depression nor asthma/COPD (NN).

Results: Respiratory medicines use was 27.5% in AC+AD, 22.4% in AC, 1.7% in AD and 2.5% in NN. Respiratory health care use was 50.5% in AC+AD, 36.8% in AC, 11.6% in AD and 5.8% in NN. Respiratory drugs and health care utilization were associated with AC (OR=12.0, 95%CI=6.8-21.1; OR=8.4, 95%CI=5.6-12.6, respectively) and AC+AD (OR=14.5, 95%CI=7.2-29.0; OR=15.6, 95%CI=9.0-26.9, respectively). Health care utilization was also associated with AD (OR=2.1, 95%CI=1.1-3.9).

Conclusions: Psychiatric comorbidity in subjects affected by asthma or COPD increases the impact of respiratory disease in terms of respiratory drugs and health care utilization.