analysis, significant associations were found between new-onset sciatica and age and obesity. In adjusted analysis, significant associations were found for obesity and mental workload in a qualitative aspect after controlling for age and gender. Consequently, in multivariate analysis with all the potential risk factors, obesity remained statistically significant (OR: 1.80; 95% CI: 1.19–2.71) while age (≥ 50 years vs. < 40 years) was almost significant (OR: 1.55, 95% CI: 0.99–2.44).

Conclusions In previously asymptomatic Japanese workers, the risk of developing new-onset sciatica is mediated by individual factors such as age and obesity. Our findings suggest that the management of obesity may prevent new-onset sciatica.

337 DETERMINANTS OF BACK-PAIN IN THE EUROPEAN COUNTRIES. A CROSS-SECTIONAL ANALYSIS OF DATA FROM THE FIFTH EUROPEAN WORKING CONDITIONS SURVEY

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Objectives Prevalence of back-pain in European countries has been reported to vary considerably. We used data from the fifth European Working Conditions Survey (EWCS) to explore the role of personal, occupational, and country socioeconomic characteristics in determining the national prevalence of back-pain.

Methods The EWCS was conducted in 34 countries during 2010. 43,816 subjects were interviewed using a standardised questionnaire. We analysed the prevalence of back-pain over the last year. Occupational and personal exposures investigated include: age, gender, biomechanical risk factors (carrying or moving loads; lifting or moving people; standing; tiring or painful positions; vibrations); job-demand control model; educational level; socio-economic status; housework or gardening; caring for children or elderly/disabled; performing housework or gardening; doing sporting, cultural or leisure activity outside home; somatisation tendency. We also studied the role of country socioeconomic characteristics. Analyses were performed with logistic or Poisson regression models incorporating sampling weights and with standard error clustered on NUTS regions. Multilevel models were fitted to study country socioeconomic characteristics.

Results 30,066 workers entered the main analysis. With the exception of gender, all personal and occupational characteristics were associated with back-pain in multivariate analysis; somatising tendency was the strongest predictor of the symptoms. Country socioeconomic characteristics were associated with back-pain in univariate analysis. However, no association was found after adjustment by subject-level characteristics. National prevalence of back-pain ranged between 22.1% (Ireland) and 64.2% (Portugal). Neighbouring countries frequently had similar prevalences. Adjustment for personal and occupational risk factors did not explain all of the variation in prevalence of back-pain among European countries.

Conclusions The high variability in prevalence of back-pain among European countries was not explained by subject-level characteristics. The inclusion of current country socioeconomic characteristics did not improve the fit of multivariate statistical models. Group-level characteristics and cultural factors should be investigated.

338 THE RISK OF MUSCULOSKELETAL DISORDERS IN A COHORT OF DANISH BAGGAGE HANDLERS

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Objectives To investigate associations between heavy lifting and musculo-skeletal disorders in a group of baggage handlers. It is generally accepted that heavy lifting and lifting in kneeling and stooped positions are risk factors for musculo-skeletal disorders in the shoulders, knees and lower back region. However, the influence of magnitude and time of heavy lifting on the risk of musculoskeletal disorders is still unclear. Baggage handlers are daily exposed to heavy lifting in stooped, squatting or kneeling positions in constrained spaces and hence they are a good study group for our objective. This abstract report the first results based on questionnaire data and will be supplemented later with objective data on lifting loads and diagnosed musculoskeletal disorders.

Methods We established a cohort of baggage handlers employed at Copenhagen Airport during the period 1983 to 2012 (n = 3093) and a reference cohort of men who worked in other unskilled occupations during the same period (n = 2478). Data regarding work history, lifestyle and musculoskeletal complaints were collected using a self-administered questionnaire. The response rate was 70.5%. Data were analysed using logistic regression.

Results The risk of self-reported pain in the shoulders, knees and lower back was significantly higher in the group of baggage handlers than in the reference group. The difference between the groups disappeared after adjusting for length of employment. Furthermore, the risk of pain increased with length of employment. For every 10 years of employment the risk of shoulder pain increased by 34% (OR = 1.34, CI: 1.19–1.51), the risk of knee pain increased by 45% (OR = 1.45, CI: 1.29–1.63) and the risk of lower back pain increased by 46% (OR = 1.46, CI: 1.31–1.63). Adjusting for age, height and weight did not change the results.

Conclusion The risk of self-reported shoulder, knee and lower back pain increased with the length of employment as baggage handler.

339 LIFE-TIME CUMULATIVE LIFT LOAD AND LUMBAR DISC DEGENERATION

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Objectives Lumbar disc degeneration (LDD) has been associated with cumulative lift load. However, dose-response relationship has not been established in Asia workers. The goal of this study is to investigate whether a dose-response relationship exists between LDD and lifetime cumulative lift load on lumbar disc.

Methods A total of 553 subjects who have ever worked were recruited. The participants received assessment with a questionnaire and magnetic resonance imaging (MRI) of the L-S spine.

The compression force on lumbar disc was estimated by using the 3-Dimension Static Strength Prediction Program (3D-SSPP, Center for Ergonomics, University of Michigan) software system. For each job described, the load on lumbar disc was calculated as the product of the compression force and the duration of lifting in hours. The lifetime cumulative load (Newton*hours, Nh) for each participant was then estimated by summing up the load on lumbar disc for all jobs. Logistic regression was used to assess association between MRI abnormalities and lifetime cumulative lifting load.

Results The subjects were categorised into tertiles by lumbar cumulative lift load, i.e., $<4.0 \times 10^5$, $4.0 \times 10^5 \sim < 8.9 \times 10^6$, and $> = 8.9 \times 10^6$ Nh. The prevalence rates of LDD findings varied by disc level. Observed LDD findings increased with cumulative lift load. At the L5-S1 disc level, MRI findings of disc height narrowing (Odds ratio, OR = 4.1, 95% Confidence interval, CI 1.9~10.1), dehydrationin (OR = 2.5, CI 1.5~4.1), disc protrusion (OR = 2.2, CI 1.2~4.1), annulus tear (OR = 2.2, CI 1.2~4.2), disc bulging (OR = 1.9, CI 1.2~3.1) was found among those with cumulative lifting load of $> = 8.9 \times 10^6$ Nh as compared to those with $<4.0 \times 10^5$ Newton-hours. The tests for trend were significant ($p < 0.05$) for all above-mentioned disc conditions.

Conclusions Our results suggest a dose-response relationship between cumulative lift load and LDD.

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340 CANCER INCIDENCE AND MORTALITY AMONG UNDERGROUND AND SURFACE GOLD MINERS IN WESTERN AUSTRALIA

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Background The Kalgoorlie gold miners' cohort was established in 1994, consisting of all workers (males only) who attended workplace health surveys in 1961, 1962, 1974, and 1975. In this study the follow-up of the cohort has been extended to 2011. Our objectives were (i) to estimate cancer mortality and incidence, for both surface and underground miners; and (ii) to examine the hypothesis that (underground) mining may be protective against prostate cancer.

Methods Standardised mortality and incidence ratios (SMRs and SIRs) and 95% confidence intervals (95% CI) were calculated to compare cancer mortality and incidence of the former Kalgoorlie miners with that of the Western Australian male population. Internal comparisons on duration of underground work were examined using Cox regression.

Results During 52,440 person-years of follow-up, 1,922 deaths were observed. Increased mortality from any cause was observed for the miners (SMR = 1.34, 95% CI 1.28–1.40), with hazard ratios indicating a trend for duration working underground (p = 0.02). For any cancer, mortality was increased for the total group of miners (SMR = 1.25, 95% CI 1.14–1.37). In the Cox models, lung cancer mortality and incidence were particularly increased among underground miners, even after adjustment for smoking. The SMR for prostate cancer suggested a lower risk for underground miners, but this was not supported by the incidence data with a significantly increased incidence of prostate cancer (SIR = 1.26, 95% CI 1.03–1.54) among underground miners.

Conclusions Overall cancer mortality and incidence was higher among Western Australian gold miners compared with the general population, especially for lung cancer and particularly for underground mining. This study does not support the hypothesis that miners have a decreased risk of prostate cancer: the results indicate a positive association between working as a miner and prostate cancer.

341 RISK OF LUNG CANCER IN MINERS AND QUARRY WORKERS IN A POOLED ANALYSIS OF CASE-CONTROL STUDIES

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Objectives Epidemiological studies have indicated an increased lung cancer risk among miners. We present estimates of the lung cancer risk in miners and quarry workers using a pooled database of case-control studies (http://synergy.iarc.fr).

Methods This analysis included occupational and smoking histories of 15,483 male lung cancer cases and 18,388 controls from 16 case-control studies of the SYNERGY project. Miners and quarry workers were identified from the International Standard Classification of Occupations (ISCO 1968). We differed between coal and ore mining using the International Standard Classification of Industries (ISIC Rev. 2). Odds ratios (OR) and 95% confidence intervals (CI) for developing lung cancer were estimated by logistic regression, adjusted for age, study centre, smoking and working in occupations known to entail a lung cancer risk.

Results A total of 696 lung cancer cases and 440 controls had worked for at least one year as miner. Ever working as miner was associated with an OR of 1.58 (95% CI 1.33 to 1.74). The majority of miners (472 cases, 311 controls) had worked in coal mining. Ever working in coal mining was associated with an OR of 1.43 (95% CI 1.20–1.70). The corresponding OR in ore mining was 1.65 (95% CI 1.03 to 2.63). Working for at least one year in quarries (79 cases and 45 controls) was associated with an OR of 1.61 (95% CI 1.05 to 2.46). We could not observe trends with duration or time since last employment as miner or quarry worker.

Conclusions Working in mines or quarries was associated with an elevated lung cancer risk. We found no trend by duration of employment. These results were derived from job titles and industry codes with detailed information on smoking and other occupations hold during lifetime. Exposure to quartz or coal dust and the prevalence of silicosis could not be evaluated.

342 MORTALITY AND PROPORTIONAL CANCER INCIDENCE IN MINNESOTA TACONITE WORKERS

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Objective In response to public concerns about health in Minnesota taconite mining workers, we evaluated the mortality and cancer experience in this population.

Methods From a cohort of 44,159 taconite workers born in 1920 or later, we selected 30,360 with at least one year of documented employment. Vital status and causes of death from death