

# Abstracts

## Industry based cohort 2

### 055 MORTALITY AND CANCER INCIDENCE AMONG SWEDISH FISHERMEN: AN UPDATE

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**Objectives:** To assess the cancer incidence and mortality patterns among Swedish fishermen, an occupational group with a high intake of locally caught fish. High dietary intake of fish provides important n-3 polyunsaturated fatty acids. However, the fatty fish from the east coast contains high concentrations of persistent organohalogen pollutants, such as PCB and dioxin.

**Methods:** Cohorts of 8564 west and 2904 east coast fishermen who had been members of the Swedish Fishermen's organisation were established. Cause specific incident cancer cases and cause of death were recorded up to 2002 through linkage with the cancer and cause of death registries. Cause-specific expected cancer incidence and mortality 1965–2002 were calculated based on national rates.

**Results:** Overall mortality was significantly decreased among the west coast fishermen (SMR 0.87) and close to unity on the east coast. Lower than expected rates was observed for deaths from malignancies, respiratory and cardiovascular diseases for both cohorts, mainly due to low rates for the earlier part of follow-up (1965–1988). The overall cancer incidence was lower than expected (SIR 0.96) on the west coast, with an inconsistent risk pattern over the observation periods, while the risk for the east coast cohort did not differ from that expected. The eastern fishermen showed a decrease in colon cancer mainly based on a lower rate for the first time period. Increased and consistent risks were seen for lip cancer in both cohorts. Squamous cell skin cancers were more frequent than expected for both cohorts during the early follow-up period.

**Conclusion:** The simultaneous finding of elevated rates for lip and squamous cell skin cancers, with mainly facial and upper limb location, indicates an occupational hazard from sun exposure for this group. The low rates for overall mortality and cancer incidence, and decreased death rates for malignancies, respiratory and cardiovascular diseases, and the low colon cancer incidence, speaks for a positive impact of high fish consumption and physical activity. However, healthy worker effect can not be excluded. The study can give some support to several studies which imply that the health benefits from a high dietary fish intake exceed the potential risks for major health outcomes.

**Key words:** fishermen; mortality and cancer; fish consumption

### 056 MORTALITY AMONG A COHORT OF US FLIGHT ATTENDANTS

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**Objectives:** To evaluate the mortality experience of 11 318 employees of a large, US-based international airline who worked as a flight attendant for 1 or more years. Based on previous studies, the primary a priori outcomes of interest were breast cancer and melanoma.

**Methods:** Vital status was updated through 2002, and life table analyses were conducted. Cumulative exposure to cosmic radiation was estimated from work history data and cosmic radiation estimates derived from flight schedules published in the Official Airline Guide.

**Results:** Overall, mortality from all causes (796 deaths, standardised mortality ratio (SMR) 0.81, 95% CI 0.75 to 0.87) and all cancers (SMR 0.77, 95% CI 0.67 to 0.87) was less than expected based on US mortality rates. However, mortality from all causes among men (SMR 1.16, 95% CI 1.05 to 1.27) was elevated, primarily due to an elevation in mortality from HIV-related diseases (SMR 16.68, 95% CI 13.67 to 20.16). Mortality was also elevated for non-Hodgkin's disease (SMR 2.52, 95% CI 1.15 to 4.78) among men; for alcoholism (SMR 3.08, 95% CI 1.47 to 5.66), drowning (SMR 5.64, 95% CI 2.06 to 12.27) and suicide (SMR 1.44, 95% CI 0.96 to 2.08) among women; and for railway, water and air transportation accidents (SMR 3.40, 95% CI 1.47 to 6.71). Mortality from non-melanoma skin cancer (SMR 6.29, 95% CI 1.30 to 18.40) was elevated among men based on three deaths; no deaths from non-melanoma skin cancer were

observed among women. Mortality from breast cancer among women (SMR 1.05, 95% CI 0.80 to 1.35) and from melanoma (seven deaths, SMR 1.15, 95% CI 0.46 to 2.37) was not significantly elevated. Mortality from breast cancer was not related to duration of employment or estimated cumulative exposure to cosmic radiation.

**Conclusion:** We found no evidence that flight attendants are at increased risk of mortality from breast cancer or melanoma. Limitations include reliance on mortality data and limited power to detect an excess for rare cancers such as melanoma.

**Key words:** flight attendants; cancer; mortality

### 057 LUNG CANCER, COPD MORTALITY, AND EXPOSURE TO SYNTHETIC METALWORKING FLUIDS IN THE AUTO INDUSTRY

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**Objectives:** Epidemiologic evidence indicates that both oil- and water-based metalworking fluids, including synthetic fluids, are associated with non-malignant respiratory disease. Endotoxin contamination may influence the respiratory toxicity of synthetic fluids and studies suggest a protective effect of endotoxin on lung cancer. Based on updated follow-up, we investigated whether exposure to synthetic fluids is associated with lung cancer and chronic obstructive pulmonary disease (COPD) mortality, treating synthetic fluid as a surrogate for endotoxin exposure.

**Methods:** We performed a nested case-control analysis from a retrospective mortality study of 46 399 hourly workers in three auto manufacturing plants, followed from 1941 to 1995. Based on incidence density sampling, each case was matched by age with 20 random controls. Retrospective exposure assessment provided estimates of total, thoracic and respirable mass particulate of synthetic, soluble and straight fluid. We used Cox regression models to estimate hazard ratios for lung cancer and COPD mortality as a function of cumulative exposure to synthetic fluid ( $\text{mg}/\text{m}^3\text{-year}$ ) adjusting for confounding by other fluid types. Exposures were lagged 5, 10, and 20 years to account for latency and address healthy worker survivor effect.

**Results:** There were 1181 and 299 deaths due to lung cancer and COPD, respectively. Workers in the highest exposure category were 26% less likely to die from lung cancer compared to unexposed workers (HR 0.74, 95% CI 0.55 to 0.99). Similarly, there was an inverse trend in risk of lung cancer mortality with increasing exposure (p value 0.03). Lagging exposure by 20 years raised the HR upwards towards null. By contrast, there was an elevated HR of 1.63 for COPD in the second exposure quintile (95% CI 0.92 to 2.86), which then declined in the higher categories of exposure. Lagging exposure by 5 years did not substantially affect the HR estimates for COPD.

**Conclusion:** The inverse risk of lung cancer mortality in relation to synthetic fluids is consistent with previous reports. Although somewhat elevated, the risk of COPD mortality is less consistent with the existing literature on non-malignant respiratory disease.

**Key words:** endotoxin; metalworking fluids; respiratory disease

### 058 BRIDGE AND TUNNEL CONSTRUCTION WORKERS' INJURIES, MORBIDITY, DISABILITY AND MORTALITY

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**Objectives:** Recent construction of long bridges and tunnels in the northern trans-European transport network has resulted in impressive structures, but at immense economic and human costs. The objectives of this study were to evaluate construction workers' injuries, morbidity, disability and mortality after participating in the building of two major bridge and tunnel projects.

**Methods:** The two construction projects were: (1) the 18 km Great Belt tunnel and bridge link between two Danish islands; and (2) the 16 km Øresund tunnel and bridge link between Sweden and Denmark. Two cohorts of male bridge and tunnel construction workers participating in the construction projects were identified and enumerated. Standard hospitalisation ratios (SHR) for injuries and relative risks (RR) for morbidity, disability and mortality were calculated for male bridge and tunnel

construction workers compared to other male construction workers in Denmark and all other employed males in Denmark.

**Results:** For workers at both construction projects standard hospitalisation ratios (SHR) for bored tunnel workers were almost twice as high (SHR 1.9) compared to all other employed males. The ratio was also higher than the ratio for the submerged tunnel workers (SHR 1.6), and high- (SHR 1.5) and low-level bridge workers (SHR 1.3). Analyses of the Great Belt construction workers revealed that they had an elevated disability retirement risk (RR 2.29) compared to other construction workers (RR 0.98) and all other employed men (RR 1.00 - reference group). The Great Belt workers also had higher morbidity (diseases) rates compared to other construction

workers (eg, ischemic heart disease RR 1.57), whereas their mortality rate was similar to that of other construction workers.

**Conclusion:** In spite of great safety and health preventive initiatives male tunnel and bridge construction workers in Denmark have a higher risk of hospitalisation, disability retirement and morbidity compared to both other male construction workers and all other employed males. The results point towards a need for addressing health and safety implications in the pre-project phase. Consideration should be given to the health and safety advantages of bored tunnels versus bridges and submerged tunnels, as well as to exposing construction workers to long working hours.

**Key words:** health; safety; Denmark