Methods. 1121 Hispanic women receiving prenatal care services through prenatal clinics in Stockton, CA, were interviewed for a study of risk factors for adverse pregnancy outcomes and the effects of immigration on risk factor profiles and pregnancy outcome. The women represented the spectrum of Hispanic immigrants from recent arrivals (<1 year) to Hispanics born in the U.S.
Results. Women born in the US were less likely to have ever worked in agriculture (8%) compared to Mexican-born women (92%), and had more education. Several risk factors for adverse pregnancy or other diseases were higher in the non-agriculture workers including ever smoking (28% vs. 10%); ever illegal drug use (21% vs. 2%); >1 sexual partner (59% vs. 29%); and >12 alcoholic drinks in lifetime (33% vs. 16%). Analyses by those currently working in agriculture showed similar results. Multiple logistic regression showed that agricultural work was independently associated with lower education (OR=1.7, 95% CI=[1.15, 2.51]) and less acculturation, as indicated by language spoken (OR=2.15, 95% CI=[1.47,3.14]). Higher education and greater acculturation were strong independent predictors of the adverse risk factor profile of non-agricultural occupations. Multivariate models adjusted for education and acculturation found a higher incidence of smoking (OR=1.5, 95% CI=[1.06, 2.36]) and a higher number of sexual partners (OR=3.54, 95% CI=[2.54, 4.94]) among Hispanic women in non-agricultural compared to agricultural occupations.
Conclusions. Women who have worked in agriculture are more likely to be recent immigrants to the US, and generally have lower risk factor profiles for adverse pregnancy and other health outcomes. These profiles are highly correlated with acculturation. These results identify Hispanic women in non-agricultural occupations as a group that is at a higher risk of engaging in less healthy behaviors that may affect birth outcomes, and therefore should be considered as a target group for public health interventions.

New advances in occupational epidemiology
Plenary V

160 Mortality from obstructive lung diseases and exposure to polycyclic aromatic hydrocarbons among asphalt workers

Igor Burstyn[1], Paolo Boffetta[2], Dick Heederik[1], Hans Kromhout[1], Timo Partanen[3], Ole Svane [4], Timo Kauppinen[5], Isabelle Stücker [6], on behalf of the Study Group[7]
(1) Institute for Risk Assessment Sciences, Utrecht University, Utrecht, the Netherlands. (2) Unit of Environmental Cancer Epidemiology, International Agency for Research on Cancer, Lyon, France. (3) Universidad Nacional, Heredia, Costa Rica. (4) Danish Working Environment Service, Copenhagen, Denmark. (5) Institute of Occupational Health, Helsinki, Finland. (6) INSERM U.170, Villejuif, France. (7) national collaborators from Germany, Norway, Sweden, and Israel

Background. Work in asphalt industry entails paving of surfaces with heated mixes that can contain bitumen and coal tar as binders, in addition to sand and/or gravel. Both bitumen and coal tar contain polycyclic aromatic hydrocarbons (PAHs). Asphalt paving has been associated with non-malignant respiratory diseases, but causal link and exposure-response relationships with specific exposures have not been established.
Methods. A historical cohort of asphalt workers from eight countries (Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Israel) was assembled by the International Agency for Research on Cancer. The cohort consisted of 79,822 male workers first employed for at least one season between 1913 and 1999, and accumulated 1,287,209 person-years of observation. Mortality from non-malignant respiratory diseases was compared to the general population. Exposure-response relationships were evaluated using a study-specific exposure matrix for inhalable agents: bitumen fume, coal tar, PAHs, asbestos, diesel engine exhaust and silica dust.
Results. Asphalt workers had higher mortality rates from chronic bronchitis, emphysema and asthma (obstructive lung diseases) relative to general population: 143 deaths; standardised mortality ratio: 1.21; 95% confidence interval: 1.02, 1.43. Mortality from obstructive lung diseases was associated with cumulative and average exposures to PAHs, mostly originating from coal tar. For example, cumulative exposures above 624 (ng benzo(a)pyrene/m^3)*years were associated with three-to-four fold increase in relative risk of obstructive lung diseases ($p<0.05$). Bitumen fume was weakly associated with mortality from obstructive lung diseases, but its effects could not be distinguished from those of coal tar. In a sub-cohort unexposed to coal tar, exposures to more than 3.73 (mg bitumen fume/m^3)*year increased relative risk of mortality from obstructive lung disease two-fold, but the effect was not statistically significant. Analyses with exposures estimates for asbestos, diesel exhaust and silica dust did reveal positive associations with mortality from obstructive lung diseases.
Conclusions. Our results seem to support the notion that exposures to PAHs, derived primarily from coal tar and possibly bitumen, are determinants for mortality from obstructive lung diseases. This is supported by mechanistic considerations of oxidative stress due to PAHs and their oxygenated derivatives. However, confounding (especially by tobacco smoking) and bias cannot be securely ruled out as an explanation for the observed associations. Our findings imply that recently implemented ban on the use of coal tar in the asphalt in Western Europe can be expected to reduce the risk of occupational obstructive lung diseases among asphalt workers by lowering their PAH exposure.

161 Trends in occupational injury mortality in the United States, 1980-1996

Dana Loomis[1], James F. Bena[2], A. John Bailer[3]
(1) Department of Epidemiology, University of North Carolina, Chapel Hill, NC, USA. (2) Risk Evaluation Branch, National Institute for Occupational Safety and Health, Cincinnati, Ohio, USA. (3) Department of Mathematics & Statistics, Miami University, Oxford, Ohio, USA

Background. Fatal occupational injury rates have been declining since the 1970s in most industrialized countries. Studies in some areas suggest that not all workers have enjoyed equal improvements in safety, however. We conducted a study to characterize trends in fatal occupational injury rates in the United States and identify factors associated with the magnitude of improvement in risk.
Methods. All deaths from injury at work in the US during 1980-1996 were identified from the National Traumatic Occupational Fatality data base maintained by the National Institute for Occupational Safety and Health; the size of the populations at risk was estimated from the Census of Population for 1980 and 1990. Mortality rates were computed for three categories of injury deaths: unintentional injuries, homicides, and all injuries combined. The annual rate of change was estimated by using Poisson regression to model the death rate as a function of time.
Results. The overall rate of fatal occupational injuries declined by 3% per year from a baseline of 5.8 per 100,000 in 1980. The rate of homicide declined at a slower rate, <1% per year. The rate of improvement was significantly faster for men (3%/year) than for women (1%/year), although the absolute risk remained much higher for men. The rate of death decreased rapidly among workers younger than 20 (7%/year), while workers over age 50 experienced a slower decline (2%/year). Workers of European ancestry enjoyed more rapid improvement in risk (about 4%/year) than African-Americans (3%/year) or workers of other ethnic groups (< 1%/year). Injury rates for most occupations declined at a rate near the average of 3%/year, but for some, including farmers, fishers, machine operators, and machine repairers, there was essentially no change. Several important industries, including transportation, mining and chemicals, experienced declines of 4-6%/year, but a number of others, including taxi services, textiles, and metal manufacturing, saw no change or had increasing fatality rates. The rate of homicide also increased in a number of occupations and industries.
Conclusions. Overall, US workers enjoyed steadily improved safety during the 1980s and 1990s. Possible explanations include successful

safety programs, technological changes, and elimination or export of hazardous operations through economic restructuring. The change was not uniform, however. Fatality rates increased in some occupations and industries, and there was little change in the rate of homicide. Further research on the determinants of these trends is needed.

162 Work-related mechanical and psychosocial factors independently predict new onset low back in occupational settings

ELAINE F. HARKNESS[1], ELIZABETH NAHIT[1], ALAN J. SILMAN[1], GARY J. MACFARLANE[2], JOHN MCBETH[1]
(1) ARC Epidemiology Unit, University of Manchester, Manchester, United Kingdom. (2) Unit of Chronic Disease Epidemiology, University of Manchester, Manchester, United Kingdom

Background. Low back pain (LBP) is one of the most common reasons for absence from work. Previous studies have indicated associations between work-related mechanical and psychosocial exposures and LBP. However, the exact nature of these relationships remains unclear since studies tend to focus on individual occupational groups and may be influenced by the healthy worker effect. We tested the hypothesis that work-related mechanical and psychosocial factors would predict new onset LBP in newly employed workers and examined the relative contribution of these factors in symptom onset.
Methods. We conducted a prospective study involving a total of 1081 newly employed workers from 12 diverse occupational settings. At baseline, subjects completed a questionnaire, which included an assessment of pain. Subjects free from LBP (lasting for one day or longer in the past month) as defined by a pre-shaded body manikin were eligible for follow up at 12 and 24 months. Work-related mechanical and psychosocial exposures were measured at both baseline and 12 months. Analysis used Generalised Estimating Equations to predict new LBP at 12 and 24 month follow up. Results are presented as Odds Ratios (OR) with 95% confidence intervals (CI) adjusted for age, sex and occupational group.
Results. In all 820 (76%) subjects were free from LBP at baseline and were eligible for follow up. Of those, 645 (79%) responded at 12 months and 441 (86%) at 24 months. New onset LBP was reported by 125 (20%) and 86 (20%) subjects respectively. Several mechanical exposures predicted new onset LBP: lifting >24kg at or above shoulder level (OR 2.0, 95% CI (1.1, 3.5)), pulling >56kg (OR 1.9, 95% CI (1.1,3.2)), and kneeling for 15 minutes or longer (OR 1.9, 95% CI (1.2,3.0)). Of the psychosocial factors examined stressful (OR 1.6, 95% CI 1.1,2.4)) and monotonous work (OR 1.8, 95% CI (1.1,2.8)) significantly predicted symptom onset. These five factors independently contributed to LBP onset in multivariate analysis. The prevalence of new onset LBP increased from 17% in those exposed to none of these factors to 47% in those exposed to four or more factors
Conclusions. This study adds to the growing evidence that, independently of work-related mechanical factors, work-related psychosocial factors are strong risk factors for the new onset of LBP. In occupations where heavy mechanical load bearing is unavoidable, relieving stressful and/or monotonous working conditions could provide the basis of a successful intervention to reduce the risk of developing LBP.

OCCUPATIONAL CANCER V: *OCCUPATIONAL CANCER AMONG WOMEN*
POSTER SESSION 52

P154 Cancer of the respiratory organs and smoking among Italian women. An analysis of the last two decades

IRENE FIGÀ-TALAMANCA[1]
(1) Dipart Biol Anim Uomo, Università di Roma "La Sapienza", Roma Italia

Background. Although incidence and mortality from cancers of the respiratory system have been consistently higher in males compared to females, the differences between the two genders are rapidly decreasing in many western countries. The decline in the mortality sex ratio reflects the progressive increase in the female mortality from tobacco-related respiratory cancers, concomitant with the spread of tobacco smoking among women.
Methods. The present report has the purpose of examining the trends in mortality from cancer of the respiratory organs among women in the Italian regions, in association with the trends in their smoking habits for the period 1980-1998. The data utilized in this analysis were obtained from the National Statistical Service. Mortality rates for the twenty Italian regions were standardized by age using the 1991 census of the Italian population as the standard. Data on smoking among women were abstracted from the periodic sample surveys conducted by the Italian Statistical Service to ascertain the social and health status of the population.
Results. Lung cancer mortality rates have increased during this period from 11/100.000 in 1980 to 14.9 /100.000 in 1998. The overall increase in smoking among women has been slight: from 16.7% in 1980, to 17.3% in 1998. There are marked geographical variations in both the trends of lung cancer and in changes in the smoking habits. Lung cancer mortality has increased by 43% in the north, 56% in the central and 20% in the southern regions. The prevalence of smoking in the period considered was highest in the northern and central regions of the country, (18% and 20% respectively), and lowest in the south (13,8). During the period of observation smoking increased little in the northern and central regions (less than 1%), and more in the south (2%).
Conclusions. The data suggest that in the last two decades Italian women experienced an increase in respiratory cancers, especially in the northern and central regions of the country. Smoking has increased only slightly in these regions during this period, but considering the lag time, it is likely that the lung cancer increase will continue in the next years, reducing the mortality sex ratio. In the southern regions mortality from respiratory cancers is lower, and so is smoking. However, since here smoking is increasing at a faster rate, the mortality rate from cancer is also likely to increase, reducing further the mortality sex ratio.

P155 Occupational exposure to chemicals and risk of cutaneous melanoma in Swedish women

BEATRIZ PÉREZ GÓMEZ[1], MARINA POLLÁN[1], PER GUSTAVSSON[2], NILS PLATO[2], NURIA ARAGONÉS[1], NAPOLEÓN PÉREZ[1], DIANA GAVRILA[1], JULIO PUENTE[1], YOLANDA CASTÁN[1]
(1) Enviromental Epidemiology and Cancer Area, National Center of Epidemiology/Carlos III Inst. of Health, Madrid, Spain. (2) Occupational Health/Dep. Public Health Sciences, Karolinska Institutet, Stockholm, Sweden

Background. High risks of melanoma have been found in certain jobs, suggesting that occupational exposures could be related to it. Our purpose is to estimate the risk of melanoma in women associated to occupational exposure to some chemicals.
Methods. The historical cohort of Swedish female workers in 1970, followed during 1971-1989 by record linkage with the Swedish National Cancer and Death Registers was combined with a Swedish job-exposure matrix, assigning exposure for around 90% of all individuals in the census to 14 different chemicals. Exposure was assessed for all combinations of occupations and industry, classifying them, for each substance, as "probable" (exposure exceeds TLV +10% >=66% of subjects), "possible" (between 10-66 % of subjects highly exposed) and "no exposure" (<=10% of subjects highly exposed). Log-linear Poisson models were fitted, in order to obtain relative risks (RR) for each chemical adjusted by age, period, geographical area, town size and occupational sector as a proxy for socio-economic status. We estimated all exposed vs non-exposed (Global), probable vs non-exposed (P/nE) and possible vs non-exposed (Pos/nE) risks.
Results. During follow-up 3598 melanomas where reported, though linkage with JEM let only 2747 cases for the analysis. Only chemical exposures with >= 5 cases were considered. Arsenic and peak of pesticides had only possible exposures. We present the results for the five

Volume 93, n. 5 Settembre - Ottobre 2002

Rivista fondata nel 1901
da Luigi Devoto

Issn 0025 - 7818

La Medicina del Lavoro

RIVISTA BIMESTRALE DI MEDICINA DEL LAVORO E IGIENE INDUSTRIALE
ITALIAN JOURNAL OF OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE

REDAZIONE La Medicina del Lavoro
Clinica del Lavoro «L. Devoto»
Via San Barnaba, 8 - 20122 Milano (Italy)
Tel. 02/50320125 - Fax 02/50320126

CASA EDITRICE Mattioli 1885 spa - Casa Editrice
Via Coduro, 1/b - 43036 Fidenza (PR)
Tel. 0524/84547 - Fax 0524/84751
e-mail: edit@mattioli1885.com
www.mattioli1885.com (CCP N. 11.286.432)

Pubblicazione bimestrale
Direttore Responsabile Prof. Vito Foà
Autorizzazione del Presidente
del Tribunale di Milano 10/5/1948 - Reg. al N. 47

La Medicina del Lavoro è recensita su:
Index Medicus/MEDLINE; Embase/Excerpta Medica; Abstracts on Hygiene; Industrial Hygiene Digest; Securité et Santé au Travail Bit-CIS