chemical risks (46.1%), followed by the group of physical risks (23.3%), ergonomic and psychosocial (13.8 and 13.6%, respectively). Only 3.2% corresponded to biological risks. The overall proportion of citations increased from 1966-1996 to 1997-2001 for psychosocial (11.6 vs. 16.9) and ergonomic (12.1 vs. 16.5%) risks, it decreased for the chemical (50.6 vs. 38.8%) and remained fairly constant for biological (3.5 vs. 2.7%) and physical (22.2 vs. 25.1%). A non-specific search on the Cochrane Controlled Trials Regisrer (Cochrane Library, issue 2/2001) to identify studies on occupational health yielded a total of 800 references. Further results will be provided using other databases, on the classification of references by specific risk factors and the efficiency of the searching strategy.
Conclusions. Most of the published studies have apparently been carried out for the classical risks (chemical and physical) though an increasing trend appears for those emerging (psychosocial and ergonomic), whereas research on occupational biological risks appears to be proportionally very scarce. Reviewing all this information will help the development of an evidence-based approach for occupational health surveillance. The identifieation of health problems associated to these risks is the first step of a high quality health surveillance.

118 The SABRE scheme (Surveillance of Australian workplace-Based Respiratory Events): notifieations for the first 3.5 years and results of a validation study for occupational asthma
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Background. In Australia, a notification scheme has been established to collect incidence data on occupational lung disease, similar to those which have been established in some other countries. This paper reports the first 3.5 years of the SABRE scheme and the results of an occupational asthma validarion study.
Mcthods. A notification form is mailed regularly to 46 thoracic physicians and 26 fellows of the Australasian Faculty of Occupational Medicine resident in the states of Victoria and Tasmania, who use this to report characteristics of all new cases of occupational lung disease which they see. These characteristics include the likely causative agent, smoking details and a confidence rating. The validation study was performed by blinded review by a panel of two doctors of information extracted from the medical files of a sample of reported cases of occupational asthma and other cases of non-occupational asthma from the same practices.
Results. A total of 533 diagnoses were reported for the first three and a half years of the scheme. The mean (SD) age of the 448 patients notified was 55.7 (16.2) years: age ranged from 20 to 92 years. There were 414 (86%) males and 61 (14%) females. There were 6 cases of allergic alveolitis, 209 of asthma, 51 of bronchitis, 34 of inhalation injury, 46 of pneumoconiosis, 42 of mesothelioma, 146 of nonmalignant pleural disease (121 predominantly plaques and 25 diffuse), 15 occupational lung cancer, 7 infectious diseases and 36 with another diagnosis. The most common causative agent notified was asbestos. The most common agenr notified in asthma was wood dust. The validation study of occupational asthma found only fair agreement (k=34) between the panel doctors and notifying doctors, but that this agreement was better (k=0.53) when the analysis was restricted to those eases where the reporting doctor considered the likelihood of the diagnosis was high.
Conclusions. This study has demonstrated that in a voluntary reporting scheme of respiratory and occupational physicians, the most commonly reported conditions are occupational asthma and nonmalignant pleural disease. The pattern of disease in Australia is similar to that of other schemes in Western countries. The validation study suggests that such schemes should restrict notifications only to those cases where the likelihood of the diagnosis is considered high.
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119 Work related pathologies attended by primary health eare services and oeeupations that involve risk
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Background. A voluntary notification system for work related pathologies attended by primary health care services has been developed in some Catalonia Health Districts. The objective of the study is to determine occupations that involve risk for the pathologies communicated in order to establish priorities for preventive interventions.
Methods. From the data obtained by the voluntary notification system of work related pathologies, all eases notified by the primary health care physicians to the Occupational Health Unit of the Costa de Ponent Health District during the period 1997-2001 were studied. Associations between occupation and pathology were assessed by multiple case-control studies where cases were a specific pathology (i.e. carpal tunnel syndrome) and controls the remainder pathologies. In each one of them, case odds was compared for each specific occupation (i.e. cleaning workers) with the rest of occupations. Odds ratio and confidence inrerval at 95% were used to measure the association. Statistically significant associations will be stratified by age, sex, and company size, and analysed using logistic regression models.
Results. A total of 1813 work related pathologies were notified (57,5% men). The results of the study will be presented. From them we emphasize a significantly high risk for work-related disorders of the upper extremities in cleaning workers (OR=2.69; 95% CI: 2.00-3.61) and shop assistants, cooks and waiters (OR=1.56; 95% CI: 1.12-2.19), for contact dermatitis in construction workers (OR=2.43; 95% CI: 1.26-4.42), intoxications in industry qualified workers (OR=1.78; 95% CI: 1.01-3.18), back pain in machine drivers (OR=2.76; 95% CI: 1.02-6.39), and psychosocial factors related pathologies in professionals and technicians (OR=18.19; 95% CI: 7.26-42.19) and clerks (OR=9.45; 95% CI: 3.94-20.82).
Conclusions. In spite of the limitations related to the notification system and selection bias for controls, the analysis of the results has made possible to detect occupations with increased risk to present certain pathologies. This could help to identify specific problems, to establish priorities, and to develop preventive programmes focused on certain occupational groups.

120 Unique occupational injury surveillance: regional rural injury study - II
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Background. To strengthen occupational surveillance, this effort focused on the high-risk agricultural industry to provide a better understanding of the magnitude of injuries for all persons and risk factors for childhood agricultural injuries. The Phase 1 (1999) Regional Rural Injury Study-II (RRIS-II), designed to determine the etiology and consequences of agricultural injury in a five-state region of the United States (U.S), served as the hasis for this effort.
Methods. As in the 1999 cohort, a random sample of 16,000 farm operations was selected for Phase 2 from lists maintained by the U.S. Department of Agriculture, yielding 16,322 persons (8,178 children under age 20). Unique methods were applied to collect data on incidence and consequences of agricultural injuries, as well as exposures, pertinent to the agricultural operation. Computer-assisted telephone interviews (CATI) included a nested case-control design to identify

risk factors for agricultural-related injuries to children. Participants were contacted every six months to identify injuries (cases) in the previous six-month periods of 2001. All cases, <19 years of age and controls (~4:1), (identified through an algorithm encoded into the CATI system), were interviewed to obtain relevant exposure data. The analyses, both univariate and multivariate (based on a directed-acyclic-graph causal model), will be compared to those from the 1999 RRIS-II baseline effort.
Results. Preliminary analyses of 1999 data found boys at increased risk of injury (O.R., 1.9; 95% C.I., 1.4-2.6), compared with girls, and varying risk with age (0-4 years, reference): 5-9 (1.6; 0.8-3.0); 10-14 (3.0; 1.7-5.5); 15-19 (2.2; 1.2-4.0). However, rates per 100,000 working hours were slightly lower for boys (6.3) than girls (7.9); rates by age group demonstrated a reverse trend: 5-9 (11.7); 10-14 (7.5); 15-19 (4.7). Animals were the modal source of injury (40%). Univariate analyses indicated increased risks for working with beef (O.R., 2.4; 95% C.I., 1.7-3.3), dairy (1.8; 1.2-2.7), swine (1.9; 1.2-3.1), machinery (2.0; 1.4-2.9), operating tractors (2.1; 1.5-2.9), and riding on tractors (2.2; 1.6-3.0). Initial multivariate analysis of animal-related injuries, controlling for age, gender and hours worked, found increased risks for exposures to beef cattle (2.0; 1.4-2.8) and horses (2.5; 1.7-3.7).
Conclusions. Ongoing surveillance to identify incidence and consequences of injury, as well as risk factors, will provide sound scientific data for the development of focused intervention strategies and pertinent evaluation that cannot be accomplished through traditional surveillance efforts. This is essential to reduce morbidity and mortality from injuries in the agricultural community.

121 Industries in which workers are at risk for beryllium exposure
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Background. Most epidemiologic research on beryllium-related health problems has focused on the primary industry or the large users of this metal in atomic energy and weaponry. The findings from these studies suggest that exposure to relatively low levels of beryllium can lead to sensitization and the development of chronic beryllium disease in the lungs. Therefore, it is important to identify companies outside the primary industry and atomic industry where beryllium exposure occurs. Existing data were used to identify such companies in the United States.
Methods. We relied on two sources of industrial hygiene sampling results. First, we used exposure measurements from work-site inspections completed between 1979 and 1996 by the Occupational Safety and Health Administration (OSHA). OSHA maintains these data in the Integrated Management Information System (IMIS). Second, the National Institute for Occupational Safety and Health (NIOSH) conducts work-site investigations in response to requests from the public as part of the Health Hazard Evaluation (HHE) program. We reviewed the results stored in the IMIS data base and HHE records to determine in which four-digit Standard Industrial Classification (SIC) categories beryllium had been detected at or above 0.1 $\mu g/m^3$. This level was considered to be a reliable lower limit of detection above background noise and interference in the method of analysis.
Results. A total of 111 four-digit SIC codes were identified as having at least one beryllium measurement at or above 0.1 $\mu g/m^3$, and approximately three-quarters of these industry categories were in the manufacturing sector. However, companies were also identified in many other sectors, including mining, construction, transportation and public utilities, wholesale trade, services, and public administration. Approximately a third of the four-digit SIC codes with beryllium exposure had two or more samples at or above the NIOSH recommended exposure limit of 0.5 $\mu g/m^3$, and all of these higher measurements were in the manufacturing, construction, and mining sectors.
Conclusions. Neither the IMIS nor HHE data set represents a random sample of all industries in the United States, and inspections were not conducted by OSHA or NIOSH with the intention of identifying all worksites where beryllium was used. Nevertheless, these findings suggest that exposure to beryllium can occur in secondary and tertiary industries, and additional work is needed to address this problem.

122 Surveillance methods for solvent-related hepatotoxicity
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Background. The objective of this investigation was to determine the efficacy of routinely available biochemical tests of hepatic function in relation to ultrasonographic methods for detecting evidence of early hepatic injury in workers exposed to mixed hydrocarbon solvents.
Methods. A cross-sectional investigation of 102 workers with a range of cumulative career exposures to organic solvents, including carpenters (low exposure), millwrights (intermediate exposure), and industrial painters (high exposure) was conducted. Data collection included an interview-administered questionnaire used to determine a semi-quantitative cumulative exposure index to mixed hydrocarbon solvents, obtained simultaneously with a venous sample collection for hepatic biochemical tests (alanine aminotransferase [ALT], aspartate aminotransferase [AST], alkaline phosphatase [AP], gamma-glutamyl transpeptidase [GGT], direct/total bilirubin), and hepatic ultrasonography. Sonograms were interpreted as normal, mild, or moderate to severe parenchymal change by three radiologists blinded to exposure status. Multiple linear regression analyses were used to assess hepatic biochemical levels (IU/L) and ultrasonographic parenchymal changes, respectively, as a function of cumulative exposure to mixed organic solvents (both by work type and semi-quantitative index), adjusting for the confounding variables of age, gender, alcohol intake, body mass index, and serologic evidence of prior Hepatitis B/C infection.
Results. A significant increase in the hepatic cholestatic enzyme gamma glutamyl transpeptidase (GGT) was observed in painters, with a mean level of 41 IU/L, compared with carpenters and millwrights (27 IU/L; $p<0.05$) A significant exposure-response relationship for GGT and semi-quantitative index to mixed solvents was observed in multivariate analyses controling for age, gender, alcohol, body mass index, and evidence of prior Hepatitis B/C ($p<0.05$). Along with changes in GGT, a concomirant trend towards increased sonographic parenchymal changes in relation to mixed solvent exposure ($p=0.07$) was also observed. No significant changes or trends were observed for AST, ALT, AP, or bilirubin in relation to solvent exposure.
Conclusions. The significant exposure-response relationship between gamma glutamyl transpeptidase (GGT) levels and cumulative exposure to mixed organic solvents supports a primary cholestatic effect of hydrocarbon mixtures, providing a useful biomarker of effect among exposed workers. The efficacy of GGT in surveillance of workers exposed to mixed organic solvent compounds is further supported by the consistent trend in sonographic hepatic parenchymal changes observed in relation to solvent exposure in this investigation.

OCCUPATIONAL CANCER IV: *OCCUPATIONAL CANCER AMONG WOMEN*
ORAL SESSION 43

123 The mortality and cancer morbidity experience of female workers at the Sellafield plant of British Nuclear Fuels plc, 1948-1998
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Background and methods. We present the preliminary results of the analysis of the BNFL Sellafield cohort of female workers. We report on the mortality and morbidity experience of these 6,346 employees to the end of 1998. These workers have accumulated 142,337 person-

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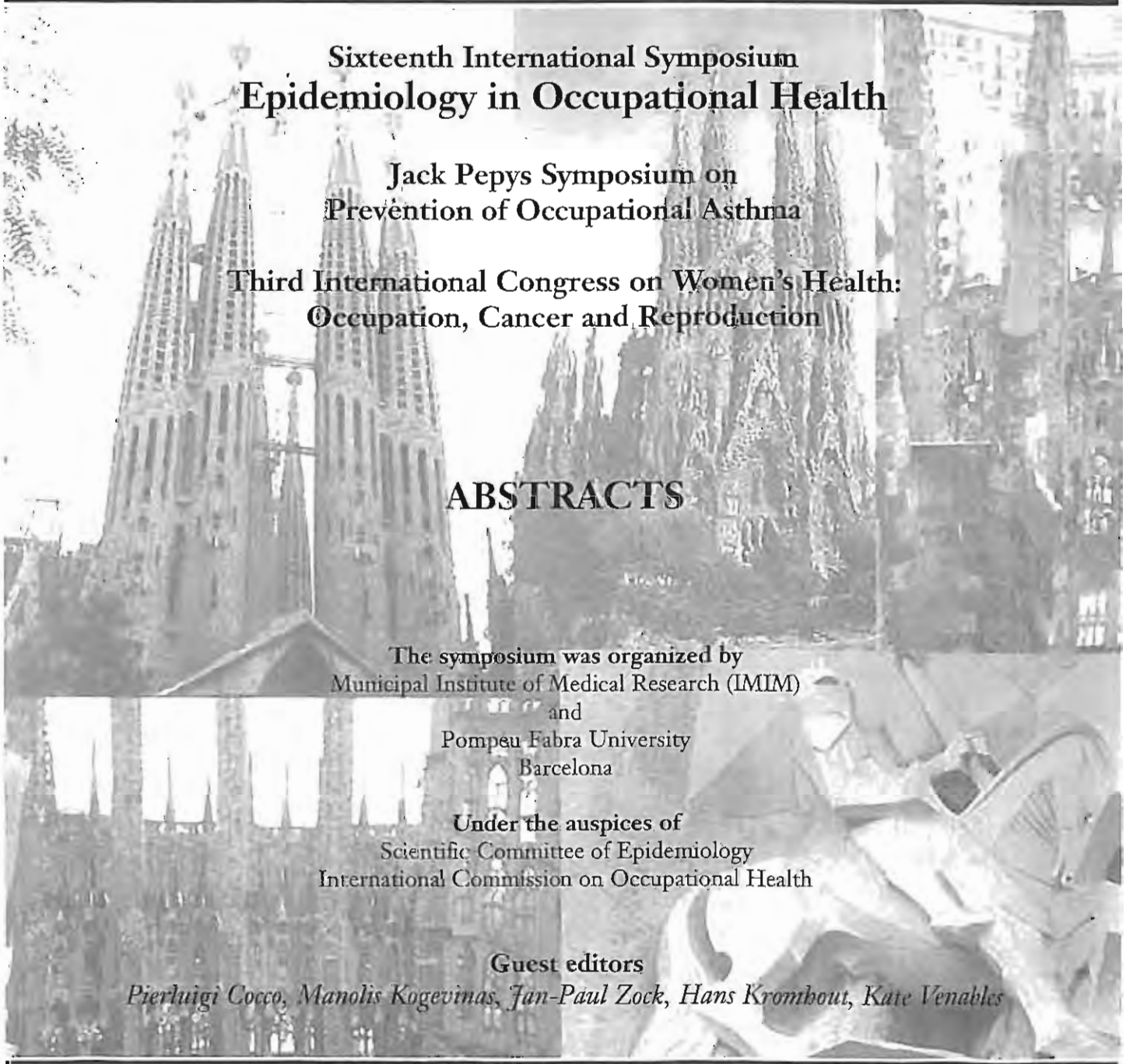

Sixteenth International Symposium
Epidemiology in Occupational Health

Jack Pepys Symposium on Prevention of Occupational Asthma

Third International Congress on Women's Health: Occupation, Cancer and Reproduction

ABSTRACTS

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