

Fig. 1.

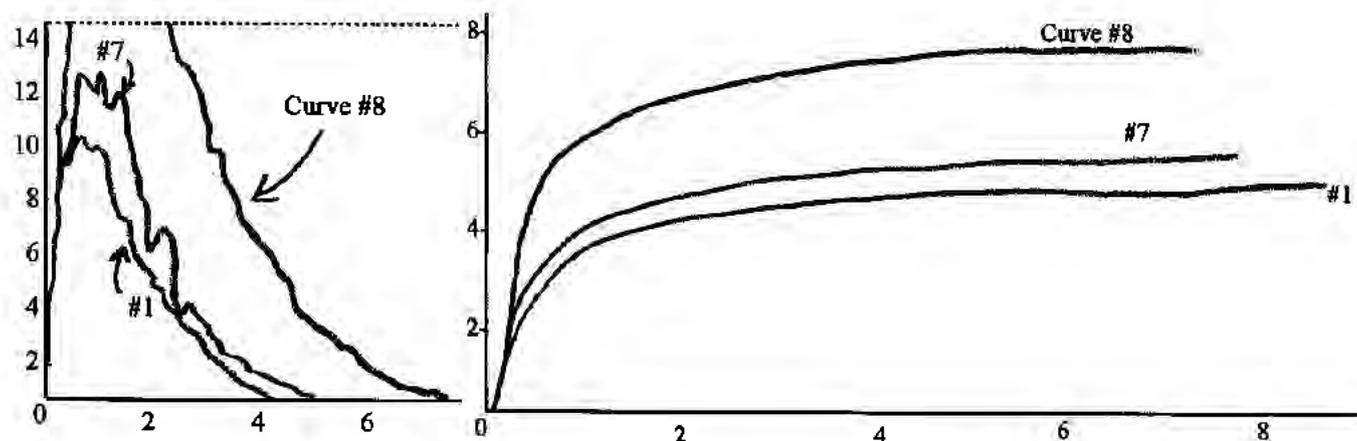


Fig. 2.

Cardiac imaging in the 12 men with ST-depression ≥ 2 mm: normal in 9; not done in 3. Adding DTS, HRR, and CI can minimize such imaging in HAZMAT workers.

21 Occupational Exposures and Birth Defects: Description of a Central Eastern European Case-Control Study

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Objective: To apply methods for assessing occupational and domestic exposures as risk factors for congenital malformations in Central Eastern European (CEE) countries. **Methods:** We used a standardized questionnaire to gather information on parental socio-demographic variables, occupations during pregnancy, and other potential risk factors in Hungary, Slovak Republic, and Poland. Between 1998 and 2000, mothers of offspring with congenital malformations of multifactorial origin and two mothers of healthy control children were interviewed. Specific workplace exposures and occupations were independently coded, including the route, level, frequency, and the period of exposures.

Results: The study successfully transferred the methods developed and evaluated in Western Europe to three CEE countries. The data set includes data on over 2000 case and control mothers. Cardiac and central nervous system anomalies are the most frequent ones (nearly 50%). About 60% of all mothers worked before and during pregnancy. High-risk occupations and exposure to chemicals can be identified. Variables can be adjusted for numerous other factors.

Conclusions: The study will enable us to assess the associations between different occupational exposures and birth defects.

22 Is My Lung Function Really That Good? Spirometer Problems That Elevate Test Results

MC Townsend, JL Hankinson, L Lindesmith, WA Slivka, GT Ayres

Background: Most spirometry technique and equipment errors *reduce* subjects' test results. However, changes in flow-type spirometer sensors or calibration can occur during subject testing that seriously *elevate* test results. Anomalous spirometry from various occupational medicine settings are presented to illustrate these often-unrecognized problems.

Results: Spurious results were probably caused by inaccurate zeroing, water vapor

condensation, mucus deposition, warming, or unstable calibration of spirometer sensors. Inaccurate zeroing of the sensor inflated one subject's FVC to 204% of predicted (Fig. 1), and probable mucus or vapor condensation on a screen pneumotach increased another subject's FVC to 144% of predicted (Fig. 2). Zero flow errors and changes in sensors during subject testing probably caused 40% of 121 working men to record both FVC and $FEV_1 > 120\%$ of predicted in respirator medical clearance programs.

Conclusion: Unlike poor testing technique, which often reduces spirometry results, these errors substantially elevate results, leading to possible false-negative interpretations. Spirograms should be scrutinized for zero flow and sensor-related errors, and patterns of high FVC and FEV_1 should alert users to probable spirometer malfunction.

23 Risk for Low Back, Neck, and Shoulder Pain Among Home Health Care Workers

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Background: Home health care (HHC) workers are reported at risk for injuries due to patient transfers.

Methods: A questionnaire was administered to 883 employees of 24 HHC agencies. We calculated prevalence rates and prevalence rate ratios (PRRs) for self-reported episodes of work-related low back, neck, and shoulder pain in three job classes (aides, nurses, and all others) for the prior 12 months.

Results: One-year period prevalence rates for aides, nurses, and all others, respectively, were calculated as follows: low back pain, 58.1%, 45.8%, and 28.8%; neck pain, 32.9%, 34.8%, and 22.6%; and shoulder pain, 33.5%, 31.7%, and 19.9%. PRRs adjusted for age, sex, BMI, job/personal satisfaction, and smoking were calculated for aides and nurses using all others as controls: low back pain, aides [PRR = 3.4 (95% CI = 2.3–5.3)], nurses [PRR = 2.1 (95% CI = 1.3–3.3)]; neck pain, aides [PRR = 1.7 (95% CI = 1.1–2.7)], nurses [PRR = 1.8 (95% CI = 1.1–3.0)]; shoulder pain, aides [PRR = 2.03 (95% CI = 1.3–3.3)], nurses [PRR = 1.9 (95% CI = 1.1–3.1)].

Conclusions: Aides are at highest risk for low back and shoulder pain, and nurses appear to be at highest risk for neck pain.

Abstracts

American College of Occupational and
Environmental MedicineAbstracts for AOHC Session 2301:
Current Research in Occupational and Environmental
Medicine**1 Mortality Follow-up and Acute and Chronic Disability Among US Farmers and Pesticide Applicators: The National Health Interview Survey (NHIS)**

O Gómez-Marín, D Zheng, W LeBlanc, D Lee, **LE Fleming**, F Ma, T Pitman, D Jane
Background: To establish and apply a methodology to assess the mortality experience and predictors of health status and acute and chronic disability for farmers and pesticide applicators compared to all other US workers using the 1986–1994 National Health Interview Surveys (NHIS).

Methods: After adjustment for sample weights and design effects using SUDAAN, several measures of acute and chronic disability and health status were modeled using Cox regression mortality analysis and multiple logistic regression.

Results: Farmers were, on average, significantly older than the rest of the US workforce. After adjusting for age, gender, race-ethnicity, and education, compared to all other US workers ($n = 453,219$), farmers ($n = 9576$) and pesticide applicators ($n = 180$) were more likely to be male, White, Hispanic, and less well educated. There were 571 deaths among the pesticide-exposed workers compared to 1,992 deaths among 438,228 other US workers. 1. Age-adjusted risk of accidental death as well as cancers of the nervous and lymphatic/hematopoietic systems was significantly elevated in male and female pesticide-exposed workers; breast, prostate, and testicular cancer mortality risks were not elevated. Farmers were significantly less likely to report acute and chronic disability and poor health, while pesticide applicators were more likely to report chronic disability and poor health.

Conclusions: Compared to all other workers, farmers and pesticide applicators were at greater risk for accidental mortality. These pesticide-exposed workers were not at increased risk for cancers possibly associated with exposure to estrogen analog compounds but were at increased risk for hematopoietic and nervous system cancers. Given the cross-sectional nature of the data and the significant job demands of farming, both leading to a relative healthy worker effort, the present results indicate that at any point in time, compared to other US workers, farmers are, in general, healthier, whereas, despite the small numbers, pesticide applicators have similar or poorer health. The NHIS mortality follow-up and survey data represent an important occupational health surveillance instrument.

2 Analysis of Adverse Events After Anthrax Immunization in US Army Medical Personnel

GM Wasserman, JD Grabenstein, PR Pittman, MV Rubertone, PG Gibbs, LZ Wang, LG Golder

The potential use of biological agents by a hostile government or terrorist organization warrants the protection of our service members to the greatest extent possible. Force health protection, however, should not occur at a cost of safety, so a continuous assessment of benefit and risk to our military personnel is essential. At Tripler Army Medical Center, we evaluated a broad range of health effects in a cohort of 601 health care personnel immunized with anthrax vaccine adsorbed (AVA) as a military, occupational health requirement. Active surveillance showed that localized reactions were common and occurred more often in women than men. Five patients were reported to the Vaccine Adverse Event Reporting System, but only one event could be definitively attributed to immunization, a large localized reaction. Two separate cohort studies, one using nested data from a standardized health risk appraisal instrument and the other comparing rates of outpatient visits and hospitalizations, did not reveal significant differences between AVA-immunized and unimmunized individuals. The findings of this series of studies support the relative reactogenicity of AVA immunization but do not reveal any serious adverse events or effects on health. This is consistent with other published studies. This analysis identified no rationale for delaying protection of Service members deploying to high-risk areas who face the threat of aerosolized anthrax and strongly supports a benefit/risk ratio in favor of using AVA for Department of Defense service members, particularly those deployed to high-threat areas.

3 Regional Rural Injury Study-II: Agricultural Household Injury Experience and Etiology of Agricultural Injuries Among Children

SG Gerberich, CM Renier, RW Gibson, LR French, AS Masten, TR Church, BH Alexander, SJ Mongin, A Ryan, X Zhang

The need for injury data systems and the use of epidemiologic data as the basis for injury intervention strategies have been reported as essential to effective control of the

major public health problem of agricultural trauma. A cohort of agricultural operation households in a five-state region involved 16,538 persons; 51% were <20 years of age. Data were collected for 1999 to identify all injury events and household demographics; exposures of interest were collected for those <20 years through the application of a simultaneous nested case-control study.

For those <20 and 20+ years of age, respectively, overall annualized injury rates were 146 and 176 per 1000 persons. Primary sources of agricultural injuries, respectively, were animals (41%, 32%) and falls (31%, 23%); 17% and 14% identified ≥ 7 days of lost agricultural work time. Increased risks (ORs) for those <20 years of age were: operating/riding in a motor vehicle (3.5); riding on (2.1) or operating a tractor (1.8); operating large (1.7) or small (1.7) equipment; and working with horses (2.4), sheep (2.1) or beef cattle (1.8).

4 Reducing Eye Injuries in Latino Farm Workers

L Forst, HY Chen, R Jimenez, S Skinner, S Bauer

Background: Eye injuries and illnesses are among the most prevalent occupational health problems in agriculture. Latino migrant and seasonal farm workers have an increased risk of injuries because of work in a particularly hazardous sector, low wages, no benefits, seasonal work, language and cultural barriers, and poor access to health care.

Objectives: The overall goal of this project is to assess the *promotor de Salud* (community health worker) model and training as intervention strategies to reduce the incidence and severity of work-related eye injuries and illnesses in Latino, migrant farm workers. A secondary goal was to determine whether a quasiexperimental study could be executed in this population.

Methods: Thirty-two farms with approximately 800 farm workers were divided into three intervention blocks: Block A received safety eyewear, and all farmworkers were trained by *promotores de salud*—peer health advocates; Block B received eyewear and had *promotores* present, but received no training; Block C farmworkers got glasses alone. The interventions were evaluated by pre- and postintervention questionnaires and observations on the farms.

Results: Approximately 700 farm workers participated, with an average age of 33.8 (± 13.3); approximately 20% were women.

Random Effects ANCOVA was used to analyze questions, with adjustment for age, gender and for multiple comparisons. All blocks were more likely to report use of safety glasses following the intervention ($P < 0.0001$). Block A showed statistical significance for self-reported use of safety glasses when compared to B ($P = 0.0001$) and C ($P = 0.03$), individually; A+B showed significance over Block C alone ($P = 0.0004$). Walk-through observations confirmed these findings. For most of the questions related to knowledge about eye health and safety, Block A subjects changed significantly with the intervention, compared to the other two groups.

Conclusions: Presence of *promotores* plus training was the most important predictor of self-reported and observed use of safety glasses. Training increased knowledge about eye health and safety. We were able to execute this field study utilizing *Promotores de salud* to assist in the research.

5 HSP 60: A Biomarker for Nasal Irritation?

RJ Laumbach, DL Laskin, CR Gardner, N Fiedler, J Zhang, P Lioy, T Fan, K Kelly-McNeil, HM Kipen

Background: HSP 60 is one of a set of heat shock proteins (HSPs) that are induced by various types of cellular stress. We hypothesized that HSP60 would be increased in nasal epithelium after low-level chemical irritant exposure.

Design: In a repeated-measures design, 62 healthy women completed (to date) three 3-hour exposure conditions: 23 VOCs at 7 ppm alone (VOC) and with ozone at 40 ppb (VOCO), and clean air (CA). Symptoms were rated before, during, and after exposure. Nasal lavage fluid (NL), collected before and after exposure, was analyzed for PMN count, IL-6, and IL-8. We measured expression of HSP60 in NL cells (primarily epithelial cells) before and after the VOCO exposure in five subjects for whom sufficient cells were available for analysis. Insufficient cells were available for analysis pre- and post- the VOC or CA control condition.

Results: We found no significant differences in total symptoms or nasal symptoms between VOCO, VOC, and CA conditions, nor did we find differences in markers of nasal inflammation between conditions. Using a semiquantitative Western blot technique, HSP60 mean integrated optical density was 2.75 pre- and 6.63 post-VOCO exposure ($P = 0.03$).