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Ventilation Type as a Risk Factor for Building-Related Symptoms in the California Healthy Building Study. M.J. Mendell,* W.J. Fisk, J.A. Deddens, W. Seavey, J.M. Daisey, A.H. Smith (NIOSH, Cincinnati, OH 4522).

The California Healthy Building Study assessed risk factors for building-related symptoms among office workers in 12 representative public office buildings in northern California, using a worker questionnaire, building inspections, and environmental measurements. No environmental contaminants measured were above existing health standards. Mechanical ventilation, either without air-conditioning (MECH) or with air-conditioning (AC), was associated with increased odds ratios (ORs), relative to natural ventilation, for a number of building-related symptoms, after adjustment for personal, job, and workplace factors in logistic regression models. Adjusted ORs [and 95% confidence intervals (CI)] for symptoms in MECH and in AC respectively included: eye symptoms, 1.7 [0.9-3.4] and 2.1 [1.1-4.0]; upper respiratory symptoms, 1.8 [1.0-3.2], and 1.9 [1.1-3.2]; multiple respiratory symptoms, 2.9 [1.0-8.0] and 2.8 [1.1-7.6]; multiple mucus membrane symptoms, 3.3 [1.2-9.5] and 3.4 [1.3-9.1]; and skin symptoms, 6.0 [1.6-22] and 6.0 [1.7- 21]. A set of symptoms (toothache, earache, and shoulder pain) hypothesized to be unrelated to indoor air quality was, as predicted, not associated with MECH or AC: 1.0 [0.5-2.1], and 1.1 [0.6-2.0], suggesting that reporting bias does not explain the findings. Exploratory adjustment for correlated occupant responses within study spaces, using generalized estimating equations, produced little change in most ORs or CIs. These findings corroborate European studies reporting that mechanical ventilation and air-conditioning are associated with increased risk of building-related symptoms. One potential explanation for these findings, supported by other research, is that building ventilation systems can produce or disseminate air contaminants.

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Respiratory Health Outcomes in People Living Near Lead Smelters in Missouri. G. Terracciano,* K. Davis, D. Roberts, M. McGeehin (Agency for Toxic Substances and Disease Registry, Atlanta, GA, 30333).

Several studies have shown an association between exposure to air pollutants and adverse respiratory health outcomes. However, the adverse outcomes reported and the pollutant concentrations associated with the outcomes have varied. This cross-sectional study combined assessment of individual exposure to air pollutants (sulfur dioxide, sulfate, and lead) using personal exposure monitors, a respiratory questionnaire, and spirometry to evaluate the respiratory health of people living near lead smelters in three Missouri communities. The target (exposed) areas were two communities with a lead smelter; the comparison (unexposed) area did not have a smelter. Of the 242 participants, 54 wore personal monitors. Reports of respiratory symptoms were more frequent in target area participants, especially women. Target area participants were more likely to have abnormal spirometry results than comparison area participants [odds ratio (OR)=1.5, 95% confidence interval (CI)=0.8, 2.0], particularly in women who did not smoke (OR=3.6, 95% CI=1.3, 9.4). Several factors besides living in the target areas were associated with respiratory symptoms and pulmonary function: use of a wood stove for heating, cigarette smoking, occupational exposure to wood or sawdust, and having an annual household income less than $20,000. Participants with higher personal monitor measurements reported more respiratory symptoms and had lower spirometry results than residents with lower personal monitor measurements. This study has raised the questions of how long-term exposure to low levels of pollutants might increase susceptibility and whether contaminant combinations might have a synergistic effect on adverse respiratory health outcomes.

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Multisite Study of Lead Exposure in Young Children. F. Stallings, M. McGeehin,* P. Jones, S. Sarasua (Agency for Toxic Substances and Disease Registry, Atlanta, GA 30333).

A multisite study design was used to evaluate exposure to lead in children under the age of 6 years who reside near four National Priority List (NPL) sites with long histories of mining/smelting activities. Sampling data showed elevated levels of lead in residential soil at each of the sites. Similar protocols were developed for the four individual studies to permit the data to be combined and analyzed as one data set. Blood specimens were collected from 881 target area children and 194 children from the comparison area. Concurrent environmental samples were taken to assess the lead concentration in yard soil, house dust, drinking water and interior and exterior paint. The geometric mean for blood lead in target area children (5.37 ug/dl) was statistically significantly higher than for comparison area children (3.97 ug/dl) ($p<0.01$). The percentage of target area children above 10 ug/dl was 15.9% compared to 8.2% in the comparison area. Using multivariate analysis, area of residence ($p<0.01$) and lead concentrations in yard soil and house dust ($p<0.01$) were significant predictors of blood lead, along with household income, head of household education level, and being male. These factors accounted for 26% of the mean blood lead variance observed in study participants. This investigation demonstrated that a multisite study design is a practical approach for conducting environmental epidemiologic research by increasing sample size and the generalizability of the results.

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Patterns of Cellular Telephone Use. D.P. Funch,* J.E. Loughlin, K.J. Rothman, N.A. Dreyer (Epidemiology Resources Inc., Newton Lower Falls, MA 02162-1450).

Studying the effect of cellular telephone use demands consideration of phone type (e.g., mobile or hand-held) and pattern of usage (e.g., frequency and duration of calls), among other considerations. Billing data are a possible source of information on phone type and usage, but the data relate to the telephone rather than to an individual user, and may be misleading if the phone is frequently shared. The authors conducted a survey to assess the association between reported phone use and actual billing data. Subjects were a systematic sample of 5550 current cellular telephone users from 4 cities, sampled in equal numbers from categories of high, medium and low use. Subjects were offered an inducement to participate and 4102 (74%) responded to one of two mailings. The cellular telephone company provided billing data for the 3-month period immediately preceding the survey. Thirty-four percent of respondents reported use of hand-held cellular telephones, with 27% reporting use of mobile telephones, 32% portable bag phones, and 7% reporting use of multiple telephone types. Approximately half of the respondents reported sole use of the telephone; individuals with multiple telephones reported greater shared use. Most respondents were male (62%); the median age was 41. The median call length was 2 minutes with an average of 8 calls/week with little geographic variation. There was a high correlation between the total minutes per week of telephone use reported by respondents and the total number of minutes of telephone use recorded in the billing data ($r = 0.70$). The authors conclude that billing data may represent a useful surrogate source of exposure information in assessing the radiofrequency exposure of cellular telephone users.

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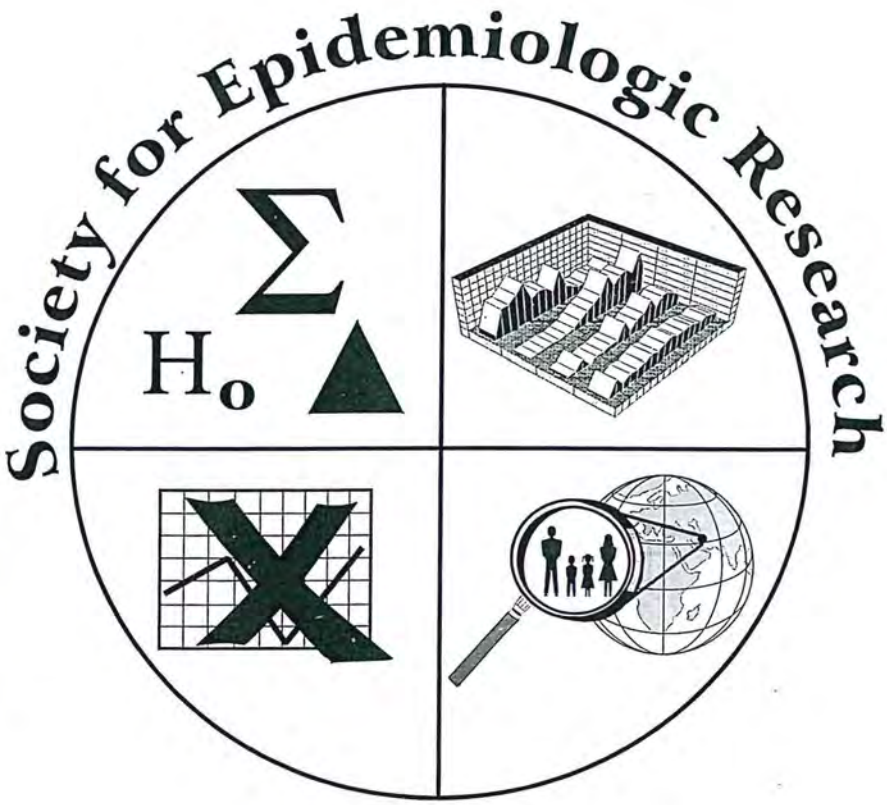

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