

ranges. The median bedroom cockroach (Bla g I) level is 0.05 units/g, with the 99th percentile at a clinically significant level of 8 units/g.

These results are being used to develop targeted research and intervention strategies.

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HOME INDOOR ENVIRONMENTS IN RURAL ASTHMATIC CHILDREN: ENVIRONMENTAL ASSESSMENT DATA FROM THE KEOKUK COUNTY RURAL HEALTH STUDY (KCRHS). E. Svendsen, S. Reynolds, C. Taylor, A. Stromquist, K. Kelly, L. Burmeister, J. Merchant, University of Iowa, Iowa City, IA

Childhood asthma prevalence is growing throughout the developed world. While most current childhood asthma studies in the United States have focused on urban population studies, the Keokuk County Rural Health Study (KCRHS) studies a completely rural population.

The KCRHS is a population-based longitudinal cohort study designed to assess respiratory illness, injury, mental health, and environmental exposures in 1000 rural households stratified according to type of residence: farm, town, and rural non-farm. Data collection instruments include medical screenings, home environmental assessments, and exhaustive medical and exposure questionnaires.

The first round of data collection was completed in early 1998 and included 619 children. All questionnaires of children ages 0–11 years were completed in proxy by their parents. Children 12 to 18 were interviewed individually. Cross-sectional analysis of the first round data has found that the childhood asthma prevalence rate in the KCRHS is 16.3% (101/619) — using the common definition of physician diagnosis and/or ever-used medication for wheezing. This rate is much higher than the national rate of 6.1% reported by the National Center for Health Statistics.

Home environmental assessments were performed in more than 90% of the households within the study. Environmental assessments included environmental questionnaires, home health and safety inspections, and farm inspections and questionnaires — when appropriate. Home age, carpet presence, mold or mildew, moisture problems, indoor pets, parental smoking, heating and cooling systems, furnace maintenance, humidity control equipment and maintenance, and attic/wall insulation are examples of some pertinent collected environmental measures.

Ongoing research within the second round of data collection will further investigate asthma environmental risk factors through a targeted case-control study involving more detailed sampling of the home environment. This presentation will highlight some of the similarities and differences in home environments observed between asthmatic and nonasthmatic households within a completely rural population.

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A LOW COST METHOD FOR MODELING CONSTRUCTION WORKER LEAD EXPOSURES BASED ON TASK. P. Becker, West Virginia University, Morgantown, WV

OSHA's *Lead in Construction Standard* permits the use of historical data to be substituted for initial air monitoring on lead exposing jobs. The ability to predict exposures and prescribe appropriate protec-

tion based on task can improve our ability to properly select engineering controls and appropriate respirators.

This study used 108 air samples for West Virginia Department of Highway bridge maintenance workers to generate a predictive model of exposures based on task. Task data were gathered by observing tasks for each worker once an hour during air monitoring. A statistically significant model was constructed using linear regression of exposure on nine task variables. Exposures for hypothetical task/duration work days were generated using the 95% upper tolerance level (UTL) to determine appropriate respiratory protection for that hypothetical work day.

The model can be used on future job sites by conducting the same 8-hour observations of task. Prescriptions for respirator use could then be made easily on site.

Models can be generated by this low-cost method; however, the models (using UTL) generate relatively high predicted exposure levels because of the high degree of variability in the sampled construction environment.

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EVALUATION OF HEALTH HAZARDS IN NEW RESIDENTIAL CONSTRUCTION. J. McKernan, NIOSH, Cincinnati, OH

Since 1994, an annual average of 1.1 million new single-family residential housing units were constructed in the United States. Despite the magnitude of construction in this specific sector, quantitative exposure data are lacking among the approximately 600,000 workers represented by various construction trades.

The purpose of this project was to identify and characterize potential chemical, physical, and ergonomic hazards associated with various work tasks performed at 15 new residential construction sites in central Ohio. From information gathered during a preliminary walk-through survey, a list of potential health hazards was developed. An evaluation of the identified potential health hazards was then conducted using a task-based exposure assessment method. Twelve construction trades were selected for quantitative exposure assessment, using NIOSH sampling and analytical methods.

To facilitate the evaluation of potential chemical, physical, and ergonomic hazards on residential construction sites, exposures were grouped into five categories: carcinogens, solvents, particulates, noise, and ergonomic hazards. A total of 300 industrial hygiene (i.e., PBZ and area) samples were collected to characterize exposure to 31 potential chemical and physical agents. Ergonomic evaluations were also performed by observing the tasks performed by the 12 selected trades and classifying worker movements into 10 categories.

Results indicate that the most commonly detected chemical exposures for residential construction workers were particulates. One trade group sampled (pre-drywall workers) exceeded the NIOSH REL and ACGIH TLV® for fibrous glass wool.

The most common physical hazard present on the residential construction sites visited was noise. Noise dosimetry results showed that framing carpenters exceeded the OSHA action level of 85 dBA as a time-weighted average (TWA). The most predominant ergonomic hazards observed were hand/wrist manipulations and arm transports.

These results indicate the need to implement controls and train workers on residential construction sites to reduce exposures to selected chemical and physical agents.

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WORKER EXPOSURE TO TOXIC CHEMICALS DURING ABRASIVE BLASTING OPERATIONS. D. Adley, KTA-Tator, Inc., Pittsburgh, PA

The focus in the industrial maintenance painting industry has been directed at protecting workers from the hazards of lead and other metals found in coatings being removed during abrasive blast cleaning. With the exception of silica sand, little attention has been directed to the contaminants in the abrasive media itself. This changed recently with the completion of a study sponsored by NIOSH.

Airborne and bulk samples were collected for 30 potential contaminants during abrasive blasting conducted on bare steel under controlled laboratory and field conditions. In all, 40 abrasives representing 13 generic categories of abrasives were evaluated.

These included coal slag, copper slag, crushed glass, garnet, nickel slag, olivine, silica sand, specular hematite, staurolite, and steel grit. Eleven health-related agents were selected for detailed analysis, including arsenic, beryllium, cadmium, chromium, lead, manganese, nickel, respirable quartz, silver, titanium and vanadium.

There is considerable variability in airborne concentrations for individual products within each category of abrasives evaluated. However, no single category eliminates the risk of exposure to all 11 health-related agents. With the exception of crushed glass and specular hematite, use of any of the abrasives can result in airborne concentrations exceeding corresponding exposure limits.

The source of worker exposures to heavy metals and other contaminants during abrasive-blast cleaning occurs from the contents of the abrasive itself, in addition to any contaminants present in the coating being removed (e.g., lead-containing paint). A holistic approach to protecting workers performing any type of abrasive-blast cleaning needs to be taken. In lieu of the substance-by-substance focus on silica sand abrasives or the hazards of lead in paint, a vertical standard encompassing all health hazards associated with abrasive blasting operations is proposed.

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EXPOSURE ASSESSMENT STRATEGY FOR THE REDUCTION OF AIRBORNE SILICA DURING JACKHAMMERING ACTIVITIES. D. Zalk, Lawrence Livermore National Laboratory/University of California, Livermore, CA

Chronic exposure to respirable crystalline silica, as quartz (silica), has been shown to cause silicosis, pulmonary fibrosis, reduced pulmonary function, and may cause cancer. Work that disturbs concrete, such as using a jackhammer to break up concrete, has the potential to create high concentrations of respirable silica dust in a worker's breathing zone. Silica exposures dramatically increase when jackhammering indoors.

The exposure assessment strategy employed for this study involved personal monitoring to characterize silica exposures while using a pneumatic jackhammer on concrete. Further monitoring was then performed to test the effectiveness of engineering controls to assist in reducing personal exposures to respirable silica. The engineering controls are in the form of accessories for the jackhammer that create a water mist at the point of dust generation. This wet method was compared with the dry (no dust control) method of jackhammering both outdoors and within a simulated indoor facility. Monitoring results indicate that using wet methods significantly reduces personal exposures.

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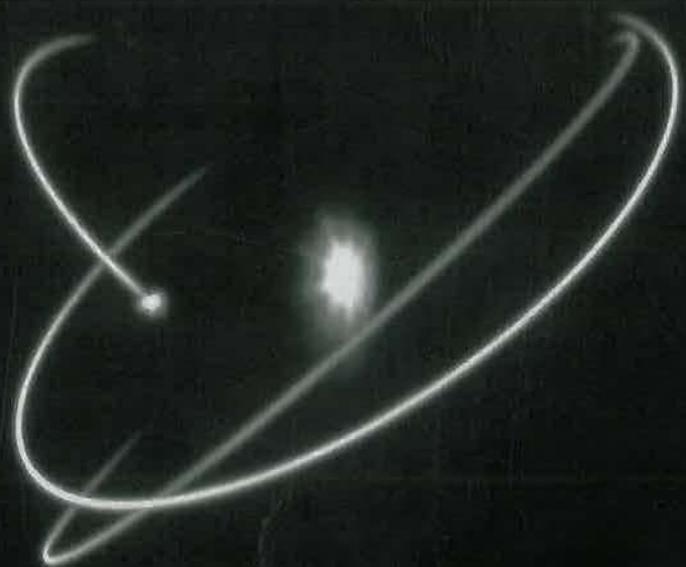
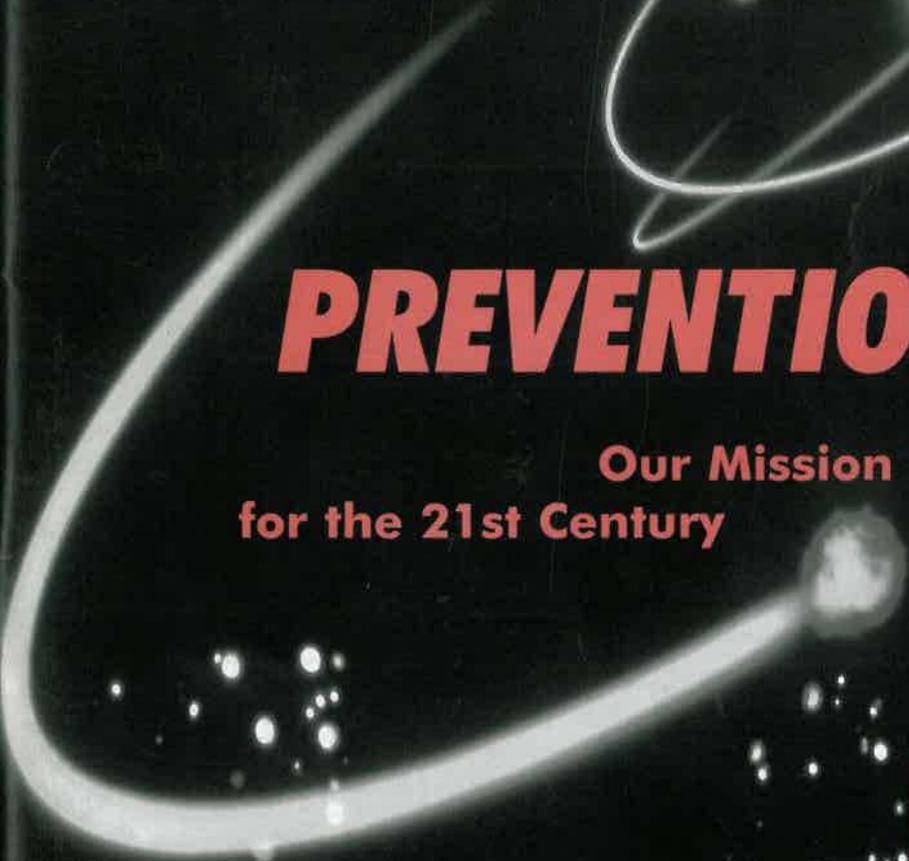


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