231.

AIRBORNE INFECTION ISOLATION ROOM LEAKAGE ANALYSIS. A. Streifel, A. Geeslin, University of Minnesota, Minneapolis, MN; G. Nelson, Energy Conservatory Inc., Minneapolis, MN.

Airborne infection isolation (AII) rooms are needed to contain patients with airborne-spread infectious diseases. The goal of this project is to measure the leakage areas of typical isolation rooms, determine the location of the leakages, seal most of the leakages, and make recommendations for an airtightness standard that is achievable based on the measurements. The criteria for these rooms are listed in American Institute of Architects and Centers for Disease Control and Prevention documents. The CDC recommends a leakage area (or equivalent orifice area) of 72 square inches in patient AII rooms. The recently reviewed TB guideline from the CDC suggests 150 square inches per room. Because these numbers do not specify a specific differential pressure at which they occur, they are invalid as standards. One commonly used standard for airtight energy efficient homes is 2.5 square inches of leakage area per 100 square feet of building envelope surface area at 0.04 inches water column. An off-set of 125 cfm for AII rooms is currently recommended. We tested rooms utilizing duct pressurization equipment to determine room leakage area. Unsealed AII rooms tested were found to have an average of 22 square inches of leakage per 100 square feet. A room that had been sealed was tested and found to have 5.6 square inches of leakage area per 100 square feet of surface area. The leakage testing procedure involves depressurizing the room using a fan to exhaust air out of the room and vary airflow volumes. This provides data that are used to calculate room leakage area. Construction specifications must be developed to determine room leakage and room seal standards. A room validation process that verifies room seal, air change rate, filtration, and relative pressure for rooms and areas needed for infectious disease management on a periodic basis must be established.

232.

EMERGENCIES CONNECTED WITH CHEMICAL RELEASES IN POLAND IN TERMS OF HAZARDOUS SUBSTANCES EMERGENCY EVENTS SURVEILLANCE SYSTEM (HSEES). A. Palaszewska, A. Swidwinska, S. Czerczak, Nofer Institute of Occupational Medicine, Lodz, Poland.

After the official agreement between the Agency for Toxic Substances and Diseases Registry (ATSDR), Atlanta, and the Nofer Institute of Occupational Medicine (NIOM), Lodz, was reached in September 2004, the Hazardous Substances Emergency Events Surveillance (HSEES) system was implemented in Poland. According to the set agreement NIOM, in close collaboration with ATSDR representatives, prepared required staff and computer equipment and developed proper agreements with potential reporting sources. In January 2005, NIOM started to collect and analyze information about acute releases of hazardous substances that need to be cleaned up or neutralized according to particular legislation as well as threatened releases that result in a public health action such as an evacuation. Initially, data collection within the HSEES concerned only one Polish administrative region—Lodz Voivodship. But one voivodship occurred to be insufficient for the estimation of the level and severity of chemical releases and their health and environmental consequences in Poland. That was the reason for collecting the data mostly from three administrative regions in the course of the study. Following the HSEES goals in the United States, including the reduction of the morbidity and mortality connected with hazardous substances events, the purpose of the pilot HSEES in Poland was not only to describe the spatial and temporal distribution of hazardous-substances emergencies and the morbidity and mortality experienced by employees, responders, and the general public but also in the long-term to identify the risk factors and develop strategies and action models to reduce subsequent morbidity and mortality among emergencies responders, employees, and the general public. Effects of the study comprising the chemical emergencies data collection in Poland are to be shown.

233.

AN INTEGRATED DECISON TOOL FOR EVALUATING CHEMICAL SAFETY IN LABORATORY RESEARCH STUDIES INVOLVING THE USE OF ANIMALS. J. Utrecht, University of Cincinnati, Cincinnati, OH; A. Maier, A. Parker, Toxicology Excellence for Risk Assessment, Cincinnati, OH; C. Pittinger, BBL Science, Cincinnati, OH; J. Stewart, Environmental Health and Engineering, Boston, MA.

Toxicology and other research studies using whole animal exposures remain a cornerstone of chemical and drug safety evaluation. These studies involve potential health consequences for researchers, laboratory personnel, and animal handlers. Therefore, approaches for assessing potential health concerns associated with study protocols are needed. To meet the requirements of Institutional Animal Care and Use Committees (IACUC) and other groups, we have developed an integrated approach for risk assessment of activities associated with conducting animal research experiments. This approach brings new tools to support the traditional elements of risk assessment. First, an evergreen database structure has been developed that summarizes key hazards of toxicants or drugs used in each newly evaluated protocol. This database synthesizes and provides a critical evaluation of toxicological data for each agent. Second, a decision-logic for evaluating the potential exposure has been developed based on physical and chemical characteristics, routes of administration and use scenarios, and toxicokinetic data. Third, a qualitative approach for aligning potential hazard and exposure to corresponding control strategies has been developed. This approach has been applied to more than 250 laboratory use protocols, and offers a tool for increasing the consistency in defining hazards as well as improving the documentation of the underlying rationale for workplace control recommendations.

234.

DEVELOPMENT OF A BIOMARKER DECISION SUPPORT SYSTEM FOR USE IN OCCUPATIONAL RISK ASSESSMENT. A. Maier, E. Hack, L. Haber, Toxicology Excellence for Risk Assessment, Cincinnati, OH; R. Savage, NIOSH, Cincinnati, OH.

For more than two decades, scientists have been touting the importance and ultimate application of biomarkers in reducing disease and protecting individuals from the harmful effects of exposure to occupational and/or environmental chemicals. While established guidelines for biomarker validation exist, methods for their implementation and case studies testing the methods are rare. This pilot study demonstrates the use of a framework for integrating complex and multifaceted data, validating biomarkers, and incorporation of the biomarkers into an occupational risk assessment for benzene. The objectives of the project were to (1) identify an occupationally relevant case study chemical; (2) develop a structure for a biomarker database that can be used to organize the diverse types of data; (3) use Bayesian analysis and regression techniques to test and validate (or discount) biomarkers along the entire exposure-disease continuum; and (4) use the biomarker database information to develop a risk assessment and compare that with a risk assessment developed using historical, traditional methodologies. A survey was developed and disseminated to 59 occupational safety and health professionals to help identify an occupationally relevant, data-rich, case study compound. Data were binned into one of the exposure-disease categories (e.g., exposure, internal dose, effective dose, early effects, mild/moderate effects, or severe effects) and entered into a customized database. A Bayesian belief network was used to validate the biomarkers by analyzing the strength of the dependencies between exposure, the potential biomarkers, and disease. Regression analysis was used to generate dose-biomarker relationships that were examined to confirm or reject biomarkers. The framework lays out an approach to consider a variety of biomarkers from the exposure-disease continuum for the enhancement of occupational risk assessment.

235.

MANAGING EXPOSURE AND ODOR ANNOYANCE IN WORKPLACES HANDLING FRAGRANCE MIXTURES. A. Panepinto, B. Kirchner, Proctor & Gamble, Cincinnati, OH.

More than 2,000 raw materials comprise the formulary available to the modern perfumer. Fragranced products are a part of everyday modern life. Managing fragrance materials in the industrial environment adds another dimension to the practice of industrial hygiene and occupational medicine. In addition to handling traditional hazards such as flammability or dermal irritancy, there is the issue of odor annoyance. This adds complexity to the process of assessing and managing exposure risk. While perfume raw materials generally exhibit characteristically low

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