ally overestimated the measured exposures by an order of magnitude or more; the overestimation was more severe in the areas with lower measured exposures. In scenarios involving segregation and nondispersion of the chemicals, EASE correctly predicted when exposures exceeded the action level (sensitivity of 100% for chloroprene samples and 96% for solvent samples) but failed to predict correctly when exposures fell below the action level (specificity of 13% for chloroprene samples and 22% for solvent samples). EASE, therefore, appears to be a potentially useful tool for conducting preliminary risk assessments, but is not a substitute for actual exposure monitoring.

88.

OCCUPATIONAL RISKS OF BLOODBORNE PATHOGEN EXPOSURES TO BODY PIERCERS AND TATTOOISTS.

S. Viet, Westat, Steamboat Springs, CO; E. Lehman, J. Huy, CDC/NIOSH, Cincinnati, OH.

Although the possibility that body piercers and tattooists are exposed to bloodborne pathogens (BBP) in their work places is clear, no large-scale study to define their occupational risks in relation to BBP exposure has occurred to date. The nature of body piercing and tattooing as small independent businesses lacking unions or other professional associations, where training is generally on site rather than through established educational systems, creates a pair of industries that is difficult to study. To further research in this area, NIOSH conducted a feasibility study of tattooists and true body piercers (not those that use guns for piercing ears). A search of the scientific, business, and popular literature was conducted to summarize what is known about exposures to piercers and tattooists. Federal- and state-based regulations were reviewed to determine the existence and extent of regulation of these occupations. An on-site walkthrough was then conducted in 12 establishments in Pennsylvania and Texas (identified from yellow page listings), some of which were members of professional tattoo and piercing associations, to observe tattoo and piercing work practices. No establishment had a written exposure control plan. Many artists had not received hazard communication training or hepatitis B vaccinations. A number of work practices were identified that could potentially expose artists to BBP, including breaking of needles and razors, and failure to protect their clothing and work seating. Recommendations for further research include looking at establishments in other non-regulated areas of the country and also those that do not advertise in the yellow pages.

Podium 113. Bioaerosol Sampling I—Traditional Approaches

Papers 89–95

89.

POWER BIOAEROSOL SAMPLING.

J. Neville, PK-Jarvis Microbiological LLC, Novi, MI; P. Epstein, Clayton Group Services, Novi, MI; S. Rupkey, Clayton Group Services, Chicago, IL; M. Hodgson, Clayton Group Services, Edison, NJ.

Bioaerosol sampling is performed to estimate microbial air concentrations in suspected building areas. Since safe bioaerosol exposure levels have not been established yet, indoor levels are compared with outdoor levels as the background control.

Industrial hygienists (IH) typically want to test the null hypothesis "does the concentration and/or biodiversity of indoor bioaerosols equal that found outdoors." Two types of errors can be made when testing the null hypothesis. The Type I error (false positive–α), will occur when the null hypothesis is rejected when in reality it should not. This may cause the IH to make a recommendation to remediate when it is not necessary. The Type II error (false negative–β), which is more destructive, will occur when the null hypothesis was not rejected when in reality it should have been. This may cause the IH to make a recommendation not to remediate when it is necessary.

Rates of Type II errors can be lowered if we increase the statistical power of sampling by increasing the number of samples. Statistical power ($1-\beta$) is the probability of rejecting the null hypothesis when in fact it is false and should be rejected. Like other areas of biological research, bioaerosol sampling strategies typically neglect use of statistical power analysis. Quite often, very few samples are taken because of client budget constraints. This increases the probability of making Type II errors.

In this preliminary study, we employ statistical power analysis on bioaerosol samples that were taken from various U.S. geographic locations. We will show the number of samples required to obtain an 80% probability that we are not making Type II errors. Data from spore trap and culture samples will be presented. Statistical power concepts as they apply to different bioaerosol sampling techniques will be discussed.

90.

PERFORMANCE EVALUATION OF PRIMARY CULTURE MEDIA FOR RECOVERY OF FUNGI COMMONLY FOUND INDOORS.

F. Wu, S. Huang, Aemtek Inc., Fremont, CA.

One of the challenges that mold investigators face today is the selection of primary culture medium for recovery of fungi. The current commercially available media are based on receipts developed for traditional applications in either mycology or plant pathology. Each medium favors certain fungi while it inevitably limits the growth of other fungi. For example, in order to capture both high water activity and osmophilic fungi, both malt extract agar (MEA) and Dichloran 18% (DG18) are used in fungal sampling protocols, but neither medium is ideal. In addition, several other media are often used for growth and identification of fungi of special interest. Recently, alternatives to MEA and DG18, gypsum amended MEA (GMEA), and salt MEA (SMEA), respectively, were suggested as having added benefit of supporting *Stachybotrys* growth. This study evaluated performances of MEA, GMEA, SMEA, and DG18 in fungal recovery. Six common indoor fungi were employed, including species of *Aspergillus, Cladosporium, Scopulariopsis, Penicillium, Stachybotrys*, and *Ulocladium*. Conidium suspensions were used as inoculates to measure germination and growth rate. The results showed that *Stachybotrys* and *Ulocladium* grew faster on GMEA than they did on MEA, while the other tested fungi showed no significant difference on MEA and GMEA. Performances of SMEA and DG18 were generally similar, except that *Ulocladium* grew faster on SMEA than on DG18. However, all tested fungi seemed to have smaller biomass on GMEA and SMEA than on their respective alternatives.

91.

EVALUATION OF VARIOUS LABORATORY APPROACHES TO SPORE ENUMERATION IN AIR SAMPLES.

C. Meyer, Aerotech Laboratories Inc., Phoenix, AZ.

The absence of a standard method for the enumeration of fungal spores in indoor air has led to a diverse range of analytical approaches and statistical analysis of data. During the analysis of spore trap cassettes, laboratories typically analyze anywhere from 15 to 100% of the sample. Depending on the nature of the sample, the percentage of the sample analyzed can have a significant effect on the final results. In outdoor air samples where the fungal spores are relatively homogeneous and free-floating, our data shows relatively little influence. In sharp contrast, air samples from indoor environments often contain aggregate fungal conidia and other multi-spore structures. Real world experience with over 1 million samples analyzed indicates that these fungal structures are deposited on spore traps in a heterogeneous pattern. Fifty-five Air-O-Cell cassette samples were analyzed via both the 15% and the 100% counting method and the results compared. When compared to reading 100% of the sample, the 15% technique failed to detect *Stachybotrys* in 9% of the samples. Eighteen percent of the samples were skewed due to heterogeneous deposition of spores. Twenty-five percent of the samples missed 5 or more genera and 9% of the samples failed to detect spores in concentrations less than or equal to 227 m^3.

The Premier Conference and Exposition for Occupational and Environmental Health and Safety Professionals

May 8–13, 2004 • Georgia World Congress Center, Atlanta, GA

Promoting OEHS Excellence

AIHce

2004 Abstracts

aihce

American Industrial Hygiene Conference & Expo 2004

Sponsored by
The American Industrial Hygiene Association
and ACGIH®