Results: The mean FSL for Visit 1 (baseline) was 0.69% (SD=0.36) with a range of 0.11% to 2.13%. The mean change in FSL between Visits 1 and 3 (one year visit) for the subjects who continued to participate through Visit 3 was 0.21% (SD=0.78), and between Visits 1 and Visit 5 (two year visit) for the subjects who continued to participate through Visit 5 was -0.06% (SD=0.63). For Visit 3, 10.2% of the subjects had unacceptable fit (90th percentile FSL > 0.05%). For Visit 5, 2.4% of the subjects had unacceptable fit. A weight loss of ≤ 20 lbs. or weight gain of ≥ 20 lbs. was experienced by 4%, 12%, 13%, and 15% of subjects on Visits 2, 3, 4, and 5 respectively. An unacceptable fit was associated with 8% of these occurrences.
Conclusions: These preliminary results indicate significant changes in fit for significant percentage of the subjects. Data collection will continue and anthropometric data will be analyzed to understand why subjects had unacceptable fit.

SR-139-03
Real-Time Fit of a Respirator during Simulated Health Care Tasks

J. Hauge, L. Brosseau, University of Minnesota, Minneapolis, MN; M. Roe, C. Colton, 3M, Saint Paul, MN.
Objective: Fit is an important but difficult-to-predict feature of respirator performance. This study examined a new approach to measuring respirator performance using two continuous direct reading particle-counting instruments in a simulated healthcare workplace.
Methods: A pilot test was conducted with eight experienced healthcare professionals, who passed a traditional quantitative fit test before performing three randomized 10-min healthcare scenarios (patient assessment (PA), IV treatment (IV), wound care (WC)). Two TSI Portacount Plus (Model 8020) with N95 Companion (Model 8095) instruments were used to continuously measure 1-sec ambient particle concentrations inside and outside the respirator facepiece. A simulated workplace fit factor (SWFF) was calculated by dividing outside by inside concentrations. Data were log transformed and examined using analysis of variance (ANOVA) between subjects, scenario types and scenario order. The GM SWFF for the eight subjects, three scenarios per subject, ranged from 172 to 1073 (GSD 1.7 to 3.5) and was significantly different for each subject.
Results: A multi-way ANOVA showed no difference among the three scenario types (PA, IV, WC). There were differences by the order in which scenarios were performed; the third scenario SWFF was significantly different and higher than that of the first and second scenarios. All subjects passed the initial quantitative fit test with a fit factor of at least 100. Five subjects had fit factors greater than 200 and GM scenario SWFFs greater than 400. Three participants with initial fit factors less than 200 had GM scenario SWFFs ranging from 132 to 326.
Conclusions: This pilot test demonstrates that it is possible to evaluate instantaneous respirator fit using two quantitative fit test instruments in a simulated healthcare environment. Results suggest that an initial fit test may be predictive of fit during simulated tasks and that one scenario may be adequate for measuring a simulated workplace fit factor.

CS-139-04
The Use of Video Exposure Monitoring in a Training Video to Motivate Fit-Testing and the Appropriate use of Healthcare N95 Respirators

M. Cohen, University of Washington, Seattle, WA; M. Roe, 3M Company, Minneapolis, MN; L. Brosseau, University of Minnesota, Minneapolis, MN.
Situation/Problem: Healthcare workers may be required to wear N95filtering facepiece respirators (FFR) to reduce potential exposure to airborne bacterial and viral agents. Motivating workers to be fit tested, wear only a fit tested respirator, and don it correctly are key to ensuring that workers obtain adequate protection.
Resolution: A training video was developed using video exposure monitoring (VEM) technology to visually demonstrate how a poorly fitting or improperly adjusted N95 FFR allows unacceptable levels of facepiece leakage. Two TSI Portacount instruments

continuously measured inside- and outside-facepiece particle concentrations while a video image was simultaneously recorded. Healthcare workers participated in several scenarios illustrating the effects of facial hair, respirators of incorrect size, and failure to properly adjust the respirator. A surgical mask was also fit tested to illustrate the very low level of protection provided. Proprietary 3M software was run on a laptop computer to communicate with the Portacounts and log the one-second average data. NIOSH-developed VEM software was used to animate the data and Adobe Premier used to create the overlay and edit the video.
Results: The VEM technology provides a very clear and easy-to-understand image that illustrates for employees the importance of fit testing, being clean shaven and using the model and size for which they have been fit tested.
Lessons Learned: Video exposure monitoring that combines recorded images and direct-reading instrument measurements of on-going respirator fit may be a useful additional training and motivational tool in combination with current fit test and educational activities in healthcare environments. Future plans include developing videos with respirators in other workplace settings.

SR-139-05
Safety Climate and Respirator Practices and Policies in Acute Care Hospitals

L. Brosseau, K. Cline, University of Minnesota, Minneapolis, MN; L. Conroy, M. Sietsema, University of Illinois, Chicago, IL.
Objective: The goal of this project was to examine the relationship between measures of safety climate and respirator practices and policies among healthcare workers and managers in acute care hospitals.
Methods: A total of 183 healthcare workers, 43 hospital managers and 47 unit managers in 15 Minnesota acute care hospitals were interviewed about respiratory protection practices and policies and completed a written survey of 10 safety climate questions about employee and manager attitudes and behaviors toward workplace safety, respirators and infectious disease exposures. Questions were scored on a 3-point scale (agree/neutral/disagree); scores were summed for an overall safety climate score, which was compared to interview responses.
Results: Safety climate was not associated with union status, length of employment or education. Overall safety climate scores were significantly worse for healthcare workers in comparison to hospital and unit managers ($p<0.0001$); unit and hospital manager scores were similar. Unit managers reporting frequency of medical clearance less than required by OSHA had significantly worse safety climate scores ($p=0.03$); no association was found for other interview categories. Employees and managers with better safety climate scores were more likely to report annual respirator training ($p<0.0001$). Healthcare workers reporting in-person training had significantly better safety scores ($p=0.008$) than those trained by other methods (e.g. internet-based, videos). Safety scores were significantly better for healthcare workers reporting that respirators were available at the point of use ($p=0.03$) and selecting a respirator for exposures to airborne pathogens during aerosol-generating procedures, in comparison to a surgical mask ($p=0.02$).
Conclusions: Better respirator program practices for medical clearance, training and infectious disease protection were associated with higher safety climate scores for employees and managers in acute care hospitals. The cross-sectional nature of these data do not elucidate, however, whether better safety climate leads to better respirator practices, or vice versa.

Podium Session 140
Biosafety and Environmental Microbiology III

Thursday, May 23, 2013, 8:30 AM – 10:30 AM

CS-140-01
Lies, Damned Lies, and Statistics: Data Interpretation and the Danger of False Conclusions

H. Burge, J. Manfrida, EMLab P&K, Phoenix, AZ.

ABSTRACTS

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