

SESSION ABSTRACTS

sion; 4) mental health/psychological disorders; 5) injuries; 6) sleep disturbance; 7) low birth weight/premature birth; 8) endocrine disruption; 9) cognitive impairment; 10) obesity/overweight, and; 11) cancer or tumorigenesis. Each review involved a systematic literature review and rating of the available evidence; reviews also included a meta-analysis of health risks when sufficient evidence was available. Using these reviews, CDC will be able to raise awareness and enhance prevention strategies.

Classification of Nonverbal Human Produced Audio Events: A Pilot Study

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The accurate classification of nonverbal human produced audio events opens the door to numerous applications beyond health monitoring. Voluntary events, such as tongue clicking and teeth chattering, may lead to a novel way of silent interface command. Involuntary events, such as coughing and clearing the throat, may advance the current state-of-the-art in hearing health research. The challenge of such applications is the balance between the processing capabilities of a small intra-aural device and the accuracy of classification. In this pilot study, 10 nonverbal audio events are captured inside the ear canal blocked by an intra-aural device. The performance of three classifiers is investigated: Gaussian Mixture Model (GMM), Support Vector Machine and Multi-Layer Perceptron. Each classifier is trained using three different feature vector structures constructed using the mel-frequency cepstral (MFCC) coefficients and their derivatives. Fusion of the MFCCs with the auditory-inspired amplitude modulation features (AAMF) is also investigated. Classification is compared between binaural and monaural training sets as well as for noisy and clean

conditions. The highest accuracy is achieved at 75.45% using the GMM classifier with the binaural MFCC+AAMF clean training set. Accuracy of 73.47% is achieved by training and testing the classifier with the binaural clean and noisy dataset.

Hearing Loss among World Trade Center Firefighters and Emergency Medical Services Workers: A 10-year Longitudinal Analysis

Presenter: Gregory Flamme, SASRAC

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Nearly all active-duty personnel in the Fire Department of the City of New York (FDNY) responded to the World Trade Center (WTC) attacks on 9/11/2001. These firefighters and emergency medical services (EMS) workers were likely exposed to noise and other ototoxic agents. Increased rates of self-reported hearing problems have been found among members of the WTC Health Registry, particularly if they were highly exposed to the WTC dust cloud. In this study of 8,646 FDNY personnel we evaluated changes in hearing over the decade after 9/11/2001 using audiometric records from regular occupational health exams. In the first analysis, thresholds before the attack were compared with the first available results after the event to identify systematic trends in 15 dB threshold shifts across exposure level. In the second analysis, we fit exponential time-to-event models to assess whether participants with greater exposures were at greater risk of 15 dB changes in threshold. FDNY personnel who arrived at the WTC site on the morning of 9/11/2001 had greater odds of a threshold shift pre-9/11 to post-9/11, and personnel who arrived earlier and spent more time at the WTC site during the recovery effort were at greater risk of hearing loss.