OCCUPATIONAL NOISE EXPOSURE AND HEARING LOSS AMONG FIREFIGHTERS IN THE UNITED STATES

OiSaeng Hong, *University of California, San Francisco, CA, USA*
Dal Lae Chin, *University of California, San Francisco, CA, USA*
Jamie Feld, *NorthShore University Health Systems, CA, USA*
Stephen Vogel, *NorthShore University Health Systems, Glenview, IL, USA*

Purpose: To assess noise exposure level, prevalence of hearing loss, and use of hearing protective devices (HPDs) among firefighters.
Methods: Focus group discussions were conducted to identify common noise sources of firefighting service. Sound pressure levels were measured and task-based exposure assessment modeling (T-BEAM) was used to estimate noise exposure potentials among firefighters. Exposure durations were based on firefighters' average response times. Demographic and work related survey and hearing tests were completed by a total of 237 firefighters in multiple states in the US.
Results: Ventilation, extraction, and fire suppression were the primary fire fighting job assignments identified. Tools required for these job assignments include chainsaws, circular saws and pneumatic chisels, sirens, axes, generators, fire truck engines, and water hoses. T-BEAM showed that firefighters have a risk potential of 85 dBA time-weighted average (TWA) on any given day. The survey and hearing test participants were predominantly middle aged (mean age=44years), Caucasian (88%), and males (94%) with an average of 17 years of work experience in fire services. About 37% showed hearing loss in the noise sensitive frequencies, 4 and 6 kHz. Firefighters with hearing loss reported significantly longer years of working in fire services ($t=5.83$, $p< 0.001$). The poorest hearing was shown in the left ear at frequencies of 2-6kH ($p<0.05$). The participants reported using HPDs 38% of the time that was needed, despite the importance of using it during all loud noise.
Conclusion: This study demonstrated a considerable noise exposure, high prevalence of hearing loss, and low use of HPDs in firefighters. More comprehensive hearing conservation programs should be implemented to reduce hearing loss, which is a costly, dangerous, and potentially career-ending disability for firefighters.