Opportunities and challenges in longitudinal assessment of hearing parameters among construction workers

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Longitudinal assessment of hearing damage in relation to well-characterized noise exposure holds significant potential for documenting the natural history, describing the exposure-response relationship, and identifying means of early detection and prevention for noise-induced damage. To accomplish these goals, a study was initiated in 1999 among a group of new construction apprentices. Annual assessments have been conducted since then including pure-tone audiometric thresholds (PTT) and distortion product otoacoustic emissions (DPOAEs), in addition to questionnaires and noise exposure measurements. After the first five years, the protocol was amended to use updated PTT and DPOAE testing equipment and to add wideband measures of middle-ear energy reflectance and the acoustic stapedius reflex (ASR) threshold. Numerous challenges have been addressed in the context of these studies including the test-retest variability of the measurements, analysis and interpretation of low-level DPOAEs, calibration of the updated DPOAE test system in comparison with the older one, and challenges in calculation of the AR. One hundred and fifty-five subjects have completed the first round of tests with the updated protocols. Despite these challenges, we are able to begin to model the effect of occupational noise on both PTT and DPOAEs, and to consider the potential modifying effect of the ASR.