

User-friendly parameterizations of an unscreened population dataset for the prediction of noise- and age-related hearing threshold shifts

Jennifer Tufts*, Paul K. Weathersby, Gales Ferry

University of Connecticut, Storrs, CT

* corresponding author: e-mail: jennifer.tufts@uconn.edu

ABSTRACT

In a noise-exposed adult with hearing loss, a portion of the deviation from audiometric “normal” may be due to noise exposure, and another portion may be due to age. Since age-related hearing loss occurs concurrently with noise-induced hearing loss, measurement or prediction of the noise effect is confounded. This confound may be managed at the population level with the use of a reference, non-noise-exposed population. However, one of the most commonly used reference populations (ISO 1999-1990, Annex A) is considered too highly screened or “pristine” for comparison with many noise-exposed populations. A less highly screened reference population is available (ISO 1999-1990, Annex B, also reproduced in ANSI 3.44-1996). Published data from this population are presented as a table of hearing thresholds for the median, 10th, and 90th percentiles at decade age intervals (age 30, age 40, etc.). Unfortunately, in this form, the data cannot be used for predicting age-related hearing loss for other ages and percentiles (e.g., age 37, 84th percentile). To improve the flexibility and usefulness of the Annex B dataset, we conducted several complete parameterizations of the entire dataset using constrained least-squares fitting methods. In this presentation, we will describe the theoretical and practical considerations behind our choice of models. Additionally, we will present preliminary equation sets for calculating predicted age-related hearing thresholds for adults of *any* age. Among the benefits resulting from this project is flexible access to an appropriate reference population in investigations of noise-induced hearing loss.