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Evaluating the Representativeness of the LANL Respirator Fit Test Panels for the Current U.S. Civilian Workers

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ABSTRACT

This study evaluated the ability of the current respirator fit test panels, developed by the Los Alamos National Laboratory (LANL) in 1973, to represent the current U.S. civilian workers. The 1967 and 1968 U.S. Air Force (USAF) anthropometric survey data of 4325 military persons (on which the LANL fit test panels were based) and the 2003 National Institute for Occupational Safety and Health (NIOSH) survey of 3998 civilian respirator users (weighted to match the 2000 U.S. census population) were used in the study.

Comparisons were made on age and racial distributions as well as key facial dimensions (face length, face width and lip length) between the USAF and NIOSH surveys. Significant differences in key facial dimensions were found among different age and race/ethnic groups within the NIOSH survey in addition to the findings that age and racial distributions of the USAF data were different from those of the NIOSH data. The bivariate distribution of face length and face width for full-face-piece applications and the face length and lip length for half-face-piece applications were different between the two surveys. Furthermore, the LANL full-face-piece panel rejected 15.3 percent of NIOSH survey subjects, which is an unacceptably high rejection rate. It can be concluded that the LANL respirator fit test panels do not represent the current U.S. civilian work force well. The newly available NIOSH data can be used to revise respirator fit test panels.