**Supplemental Table 1.** A sample of the structure of the O\*NET noise estimates index (Each row is composed of O\*NET-SOC code, O\*NET-SOC title, interest element name, mean score of interest element, and standard error of mean score, data sample size).

| O\*NET SOC Code*a* | O\*NET SOC Title | Element Name | Mean Score | S.E. | N |
| --- | --- | --- | --- | --- | --- |
| 11-1011.00 | Chief Executives | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.37 | 0.60 | 27 |
| 11-1021.00 | General and Operations Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.19 | 0.49 | 38 |
| 11-2011.00 | Advertising and Promotions Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 1.63 | 0.38 | 36 |
| 11-2021.00 | Marketing Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 1.77 | 0.32 | 15 |
| 11-2022.00 | Sales Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.95 | 0.51 | 17 |
| 11-2031.00 | Public Relations Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 1.88 | 0.34 | 26 |
| 11-3011.00 | Administrative Services Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.77 | 0.36 | 30 |
| 11-3021.00 | Computer and Information Systems Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.51 | 0.38 | 28 |
| 11-3031.01 | Treasurers and Controllers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.84 | 0.40 | 42 |
| 11-3031.02 | Financial Managers, Branch or Department | Sounds, Noise Levels Are Distracting or Uncomfortable | 1.86 | 0.58 | 15 |
| 11-3040.00 | Human Resources Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.79 | 0.45 | 25 |
| 11-3041.00 | Compensation and Benefits Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.23 | 0.32 | 30 |
| 11-3042.00 | Training and Development Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.56 | 0.81 | 17 |
| 11-3051.00 | Industrial Production Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.99 | 0.53 | 18 |
| 11-3061.00 | Purchasing Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.30 | 0.42 | 26 |
| 11-3071.01 | Transportation Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.40 | 0.34 | 27 |
| 11-3071.02 | Storage and Distribution Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.06 | 0.42 | 18 |
| 11-9011.01 | Nursery and Greenhouse Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.41 | 0.47 | 24 |
| 11-9011.02 | Crop and Livestock Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.07 |  | 29 |
| 11-9011.03 | Aquacultural Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.45 |  | 31 |
| 11-9012.00 | Farmers and Ranchers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.48 | 0.27 | 24 |
| 11-9021.00 | Construction Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.32 | 0.26 | 21 |
| 11-9031.00 | Education Administrators, Preschool and Child Care Center/Program | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.77 | 0.45 | 21 |
| 11-9032.00 | Education Administrators, Elementary and Secondary School | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.96 | 0.17 | 134 |
| 11-9033.00 | Education Administrators, Postsecondary | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.26 | 0.11 | 197 |
| 11-9041.00 | Engineering Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.49 | 0.41 | 18 |
| 11-9051.00 | Food Service Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.00 | 0.38 | 64 |
| 11-9061.00 | Funeral Directors | Sounds, Noise Levels Are Distracting or Uncomfortable | 1.94 | 0.16 | 88 |
| 11-9071.00 | Gaming Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.91 | 0.42 | 30 |
| 11-9081.00 | Lodging Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.45 | 0.41 | 23 |
| 11-9111.00 | Medical and Health Services Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.02 | 0.42 | 20 |
| 11-9121.00 | Natural Sciences Managers | Sounds, Noise Levels Are Distracting or Uncomfortable | 3.18 | 0.30 | 24 |
| 11-9131.00 | Postmasters and Mail Superintendents | Sounds, Noise Levels Are Distracting or Uncomfortable | 2.23 | 0.34 | 32 |

*a*O\*NET-SOC code are available for 801 SOC.; The element ID “4.C.2.b.1.a” is “Sounds, noise levels are distracting or uncomfortable.”; Data value (mean score of interest agent) is available between 1 to 5.

**Supplemental Table 2.** Participants characteristics by longest job information status (N=4058*a*)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|   | Characteristic  | Longest job information (N=3828) |   | No Longest job infomation (N=230) |   | *P-value* |   |
|  | O\*NET noise*b*  | 3.06 (± 0.02) |  | . |  | *.* |  |
|  | O\*NET noise*b* *(Weighted)* | 3.15 (± 0.02) |  | . |  | *.* |  |
|  | Age *(y)*  | 41.96 (± 0.27) |  | 40.62 (± 1.73) |  | *0.4454* |  |
|  | Body mass *(index:wtkg/htm)* | 28.04 (± 0.15) |  | 28.37 (± 0.65) |  | *0.6200* |  |
|  | Hearing Thresholds *(dB)* |  |  |  |  |  |  |
|  | *PTA at speech frequenciesc* | 12.72 (± 0.24) |  | 12.16 (± 0.67) |  | *0.3972* |  |
|  | *0.5 kHz* | 11.64 (± 0.23) |  | 12.52 (± 0.78) |  | *0.2652* |  |
|  | *1 kHz* | 9.59 (± 0.22) |  | 9.81 (± 0.78) |  | *0.7846* |  |
|  | *2 kHz* | 10.90 (± 0.29) |  | 10.21 (± 0.74) |  | *0.3725* |  |
|  | *3 kHz* | 14.25 (± 0.33) |  | 12.67 (± 0.91) |  | *0.0864* |  |
|  | *4 kHz* | 18.74 (± 0.42) |  | 16.11 (± 0.87) |  | *0.0035* |  |
|  | *6 kHz* | 24.56 (± 0.43) |  | 22.72 (± 1.05) |  | *0.0825* |  |
|  | *8 kHz* | 23.58 (± 0.31) |  | 22.79 (± 1.00) |  | *0.4020* |  |
|  | Hearing Loss*d (PTA>25dB, %)* | 11.1 |  | 9.0 |  | *0.3777* |  |
|  | Noise Notch*e* *(%)* | 17.6 |  | 11.8 |  | *0.0318* |  |
|  | Sex *(Male %)* | 48.5 |  | 27.2 |  | *<.0001* |  |
|  | Race ethnics (%) |  |  |  |  | *0.0039* |  |
|  | *Non-Hispanic White*  | 72.3 |  | 60.7 |  |  |  |
|  | *Non-Hispanic Black* | 10.7 |  | 12.2 |  |  |  |
|  | *Mexican American* | 6.7 |  | 10.7 |  |  |  |
|  | *Other* | 10.3 |  | 16.4 |  |  |  |
|  | Ototoxic medication *(Current use %)* | 15.9 |  | 12.5 |  | *0.2978* |  |
|  | Cumulative cigarette packyears (%) |  |  |  |  | *0.0062* |  |
|  | *Never*  | 53.6 |  | 64.8 |  |  |  |
|  | *<20*  | 33.9 |  | 25.7 |  |  |  |
|  | *≥20* | 12.4 |  | 9.5 |  |  |  |
|  | Current dx of hypertension *(%)*   | 23.1 |  | 19.8 |  | *0.2575* |  |
|  | Current dx of diabetes mellitus *(%)*   | 4.3 |  | 4.3 |  | *0.9813* |  |
|  | Noise Exposure at firearm *(Exposed %)*  | 7.4 |  | 4.3 |  | *0.1052* |  |
|  | Noise Exposure at recreation *(Exposed %)*  | 25.9 |  | 21.1 |  | *0.1861* |  |
|  | Noise Exposure at Job*f(Exposed %)*  | 33.0 |  | 9.4 |  |  *<.0001* |  |
| Continuous variables: survey t-test, age-adjusted |
| Categorical variables: 2\*2 table or 2\*C table : survey X\_square (Rao-Scott Chi-Square Test) |
| *a*Participants (N=4058) are the individuals having all interest variables in this study.: hearing thresholds, hearing loss, age,  |
| BMI, sex, race ethnicity, ototoxic medication, cumulative cigratte packyears, hypertension, diabetes mellitus, firearm noise Exposure, and recreation noise exposure |
| *b*O\*NET noise score (1 < Noise scale < 5) |
| *c*PTA at speech frequencies (Pure tone means at 0.5, 1, 2, 4 KHz)  |
| *d*Hearing Loss (PTA at speech frequencies > 25 dB) |
| *e*Noise Notch (Hearing threshold at 3,4, and/or 6 kHz is at least 10 dB greater than at 1 or 2 kHz and at least  |
| 10 dB greater than at 6 or 8 kHz.) |
| *f*Noise Exposure at Job (Questionnaire: Loud job noise, ever exposed, 3 months?) |

**Supplemental Figure 1**. Distribution of O\*NET noise scores of participants in NHANES, considered for sampling weights and unconsidered for sampling weights

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1. *Distribution of O\*NET noise scores in NHANES, (b) Distribution of O\*NET noise scores in NHANES,*

*considered for sampling weights not considered for sampling weights*

**Supplemental Figure 2**. Percent change (%) of hearing thresholds (dB) by occupational noise quintile at longest job at each frequency from 0.5 kHz to 8 kHz *(\* P-trend<0.05)*

Regression models were adjusted for age, age2, body mass index, sex, race/ethnicity, ototoxic medication, cumulative cigarette pack-years, hypertension, diabetes, recreation noise and firearm noise

Supplemental Table 3. Percent change (95% CIs) of hearing thresholds (dB) at high frequencies by noise exposure levels at longest job.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Variables | No. |   | Model A*a*  |   | Model B*b*  |   | Model Cc  |
|  | O\*NET Noise (unit score)*d* |  |  | 19.68 | (12.97, 26.79) |   | 17.01 | (10.44, 23.98) |   | 16.16 | (9.89, 22.79) |
|  | O\*NET Noise Quintile |  |  |  |  |  |  |  |  |  |  |
|  | Quintile 1 (1.795-2.588) | 675 |  | 0 | (Reference) |  | 0 | (Reference) |  | 0 | (Reference) |
|  | Quintile 2 (2.653-2.729) | 809 |  | 0.59 | (-6.34, 8.04) |  | -0.38 | (-6.97, 6.67) |  | -1.11 | (-7.63, 5.87) |
|  | Quintile 3 (2.737-2.868) | 712 |  | -2.20 | (-10.46, 6.83) |  | -3.87 | (-11.92, 4.91) |  | -4.04 | (-12.07, 4.72) |
|  | Quintile 4 (3.121-3.631) | 786 |  | 13.83 | (3.96, 24.64) |  | 10.84 | (1.16, 21.44) |  | 9.65 | (0.23, 19.96) |
|  | Quintile 5 (3.667-4.368) | 760 |  | 28.01 | (15.39, 42.01) |  | 23.10 | (10.75, 36.84) |  | 21.33 | (9.52, 34.43) |
|   | *P*-Trend |   |   | <.0.0001 |   | 0.0003 |   | 0.0004 |
| *a*Model A was adjusted for age, age2, sex, and race/ethnicity.  |  |  |  |  |  |  |
| *b*Model B: Model A + further adjusted for body mass index, ototoxic medication, cumulative cigarette pack-years, current dx of hypertension, and current dx of diabetes. |
| cModel C: Model B + further adjusted for recreation noise and firearm noise. |  |  |  |  |
| *d*Percent change in hearing thresholds for one unit score increase.  |  |  |  |  |

|  |
| --- |
| **Supplemental Table 4.** Percent change (95% CIs) of hearing thresholds +6 (dB) by noise exposure levels at longest job in entire subjects and subjects with only positive hearing thresholds |
|   | Variables | No. |   | Regression Model*a* |  |
| **A.** Entire subjects (3828 subjects) |  |  |  |  |
|  | O\*NET Noise (unit score*)b* |  |  | 9.01 | (5.47, 12.67) |  |
|  | O\*NET Noise Quintile |  |  |  |  |  |
|  | Quintile 1 (1.795-2.588) | 695 |  | 0 | (Reference) |  |
|  | Quintile 2 (2.653-2.729) | 830 |  | 1.76 | (-2.74, 6.47) |  |
|  | Quintile 3 (2.737-2.868) | 731 |  | 0.48 | (-5.06, 6.36) |  |
|  | Quintile 4 (3.121-3.631) | 805 |  | 6.97 | (1.35, 12.92) |  |
|  | Quintile 5 (3.667-4.368) | 767 |  | 13.93 | (6.67, 21.68) |  |
|   | *P*-Trend |   |   | 0.0001 |   |
| **B.** Subjects with only positive hearing thresholds (3748 subjects)  |  |
|  | O\*NET Noise (unit score*)b* |  |  | 9.27 | (6.06, 12.58) |  |
|  | O\*NET Noise Quintile |  |  |  |  |  |
|  | Quintile 1 (1.795-2.588) | 680 |  | 0 | (Reference) |  |
|  | Quintile 2 (2.653-2.729) | 807 |  | 1.83 | (-2.30, 6.13) |  |
|  | Quintile 3 (2.737-2.868) | 711 |  | 0.01 | (-5.31, 5.64) |  |
|  | Quintile 4 (3.121-3.631) | 793 |  | 7.54 | (2.07, 13.30) |  |
|  | Quintile 5 (3.667-4.368) | 757 |  | 14.00 | (7.69, 20.68) |  |
|   | *P*-Trend |   |   | <.0001 |   |
| *a*Regression model was adjusted for age, age2, body mass index, sex, race/ethnicity, ototoxic medication, cumulative cigarette pack-years, hypertension, diabetes, recreation noise and firearm noise. |
| *b*Percent change in hearing thresholds for one unit score increase. |

Supplemental Table 5. Percent change (95% CIs) of hearing thresholds (dB) by weighted noise exposure levels at longest job

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Variables | No. |   | Regression Model*a* |
|  | Weighted O\*NET Noise (unit score*)b* |  |  | 12.78 | (8.28, 17.46) |
|  | Weighted O\*NET Noise Quintile |  |  |  |  |
|  | Quintile 1 (2.020-2.578) | 817 |  | 0 | (Reference) |
|  | Quintile 2 (2.637-2.821) | 700 |  | -4.23 | (-11.72, 3.89) |
|  | Quintile 3 (2.832-2.963) | 739 |  | 1.24 | (-7.39, 10.69) |
|  | Quintile 4 (3.157-3.930) | 796 |  | 11.37 | (1.84, 21.78) |
|  | Quintile 5 (4.090-4.748) | 776 |  | 21.45 | (10.28, 33.75) |
|   | *P*-Trend |   |   | <.0.0001 |
| *a*Regression model was adjusted for age, age2, body mass index, sex, race/ethnicity, ototoxic medication, cumulative cigarette pack-years, hypertension, diabetes, recreation noise and firearm noise. |
| *b*Percent change in hearing thresholds for one unit score increase. |

|  |
| --- |
| **Supplemental Table 6.** ORs (95% CIs) of hearing loss and noise notch by weighted noise exposure levels at longest job  |
|   | Variables |  |   | Regression Model*a* |  |
| **A.** ORs of hearing loss | Hearing Loss No./ Participants No. |  |  |  |
|  | Weighted O\*NET Noise (unit score*)b* |  |  | 1.49 | (1.21, 1.84) |  |
|  | Weighted O\*NET Noise Quintile |  |  |  |  |  |
|  | Quintile 1 (2.020-2.578) | 78/817 |  | 1 | (Reference) |  |
|  | Quintile 2 (2.637-2.821) | 64/700 |  | 0.88 | (0.50, 1.55) |  |
|  | Quintile 3 (2.832-2.963) | 66/739 |  | 0.95 | (0.54, 1.69) |  |
|  | Quintile 4 (3.157-3.930) | 105/796 |  | 1.29 | (0.79, 2.12) |  |
|  | Quintile 5 (4.090-4.748) | 143/776 |  | 1.92 | (109, 3.41) |  |
|   | *P*-Trend |   |   | 0.0064 |  |
| **B.** ORs of noise notch | Noise notch No./Participants No. |  |  |  |
|  | Weighted O\*NET Noise (unit score*)b* |  |  | 1.35 | (1.14, 1.60) |  |
|  | Weighted O\*NET Noise Quintile |  |  |  |  |  |
|  | Quintile 1 (2.020-2.578) | 118/817 |  | 1 | (Reference) |  |
|  | Quintile 2 (2.637-2.821) | 89/700 |  | 0.81 | (0.59, 1.11) |  |
|  | Quintile 3 (2.832-2.963) | 90/739 |  | 0.91 | (0.67, 1.23) |  |
|  | Quintile 4 (3.157-3.930) | 166/796 |  | 1.27 | (0.95, 1.71) |  |
|  | Quintile 5 (4.090-4.748) | 192/776 |  | 1.54 | (1.13, 2.11) |  |
|   | *P*-Trend |   |   | 0.0005 |  |
| *a*Regression model was adjusted for age, age2, body mass index, sex, race/ethnicity, ototoxic medication, cumulative cigarette pack-years, hypertension, diabetes, recreation noise and firearm noise. |
| *b*Percent change in hearing thresholds for one unit score increase. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Supplemental Table 7.** Percent change (95% CIs) of hearing thresholds (dB) by noise exposure levels at longest job at participants groups.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | O\*NET Noise (unit score)*a* | No. |   | Regression Model*b* |   |
|  | Overall | 3748 |  | 15.43 | (9.70, 21.45) |  |
|  | *Age (year)* |  |  |  |  |  |
|  | *20-39* | 1647 |  | 13.32 | (4.38, 23.04) |  |
|  | 40-59 | 1413 |  | 19.61 | (10.32, 29.69) |  |
|  |  60- | 688 |  | 7.10 | (0.81, 13.78) |  |
|  | *Sex* |  |  |  |  |  |
|  | *Male* | 1757 |  | 18.93 | (12.30, 25.96) |  |
|  | *Female* | 1991 |  | 8.85 | (0.15, 18.30) |  |
|  | *Race ethnicity* |  |  |  |  |  |
|  | *Non-Hispanic White* | 1838 |  | 18.34 | (11.01, 26.16) |  |
|  | *Non-Hispanic Black* | 776 |  | 5.35 | (-5.06, 16.91) |  |
|  | *Mexican Amerian* | 812 |  | 4.86 | (-3.00, 13.34) |  |
|   | *Other* | 322 |   | 12.74 | (-1.30, 28.79) |   |

 |
|
| *a*Percent change in hearing thresholds for one unit score increase.  |  |
| *b*Model C: adjusted for age, age2, sex, and race/ethnicity, body mass index, ototoxic medication, cumulative cigarette pack-years, current dx of hypertension, current dx of diabetes, recreation noise and firearm noise. |

Supplemental Table 8. ORs (95% CIs) of hearing loss by contribution of different variables in a multiple logistic regression

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Variables | Hearing Loss No./ Participants No. |   | Regression Model*a* |
|  | All | 456/3828 |  |  |  |
|  |  |  |  |  |  |
|  | O\*NET noise *(unit score change)* |  |  | 1.65 | (1.28, 2.13) |
|  | Age *(unit year change)* |  |  | 1.07 | (0.98, 1.18) |
|  | Age2 *(unit year change)* |  |  | 1.00 | (1.00, 1.00) |
|  | Body mass index *(10 wtkg/htm change)* |  |  | 0.99 | (0.97, 1.02) |
|  |  |  |  |  |  |
|  | Sex  |  |  |  |  |
|  | *Female* | 147/2043 |  | 1 | (Reference) |
|  | *Male* | 309/1785 |  | 0.49 | (0.37, 0.64) |
|  | Race ethnicity |  |  |  |  |
|  | *Non-Hispanic White*  | 261/1880 |  | 1 | (Reference) |
|  | *Non-Hispanic Black* | 59/794 |  | 0.41 | (0.28, 0.59) |
|  | *Mexican American* | 94/827 |  | 0.71 | (0.53, 0.97) |
|  | *Other* | 42/327 |  | 1.31 | (0.80, 2.15) |
|  | Ototoxic medication |  |  |  |  |
|  | *No* | 343/3243 |  | 1 | (Reference) |
|  | *Yes* | 113/585 |  | 1.06 | (0.79, 1.41) |
|  | Cumulative cigarette packyears |  |  |  |  |
|  | *Never*  | 184/2177 |  | 1 | (Reference) |
|  | *<20*  | 145/1227 |  | 0.96 | (0.65, 1.42) |
|  | *≥20* | 127/424 |  | 1.54 | (1.11, 2.15) |
|  | Current dx of hypertension  |  |  |  |  |
|  | *No* | 242/2809 |  | 1 | (Reference) |
|  | *Yes* | 214/1019 |  | 1.12 | (0.84, 1.49) |
|  | Current dx of diabetes mellitus |  |  |  |  |
|  | *No* | 389/3603 |  | 1 | (Reference) |
|  | *Yes* | 67/225 |  | 1.66 | (0.99, 2.77) |
|  | Noise Exposure at firearm |  |  |  |  |
|  | *No* | 406/3593 |  | 1 | (Reference) |
|  | *Yes* | 50/235 |  | 1.41 | (0.89, 2.23) |
|  | Noise Exposure at recreation |  |  |  |  |
|  | *No* | 343/2948 |  | 1 | (Reference) |
|  | *Yes* | 113/880 |  | 1.62 | (1.21, 2.17) |
| *a*Regression model was adjusted for age, age2, body mass index, sex, race/ethnicity, ototoxic medication, cumulative cigarette pack-years, hypertension, diabetes, recreation noise and firearm noise. |
|  |