**APPENDIX 1: Minimally adjusted models**

**Section 1: Models using pack-years**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,829.1 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

AIC: Akaike information criterion

Cov.: covariates

Est.: beta estimate

Std. Err.: standard error

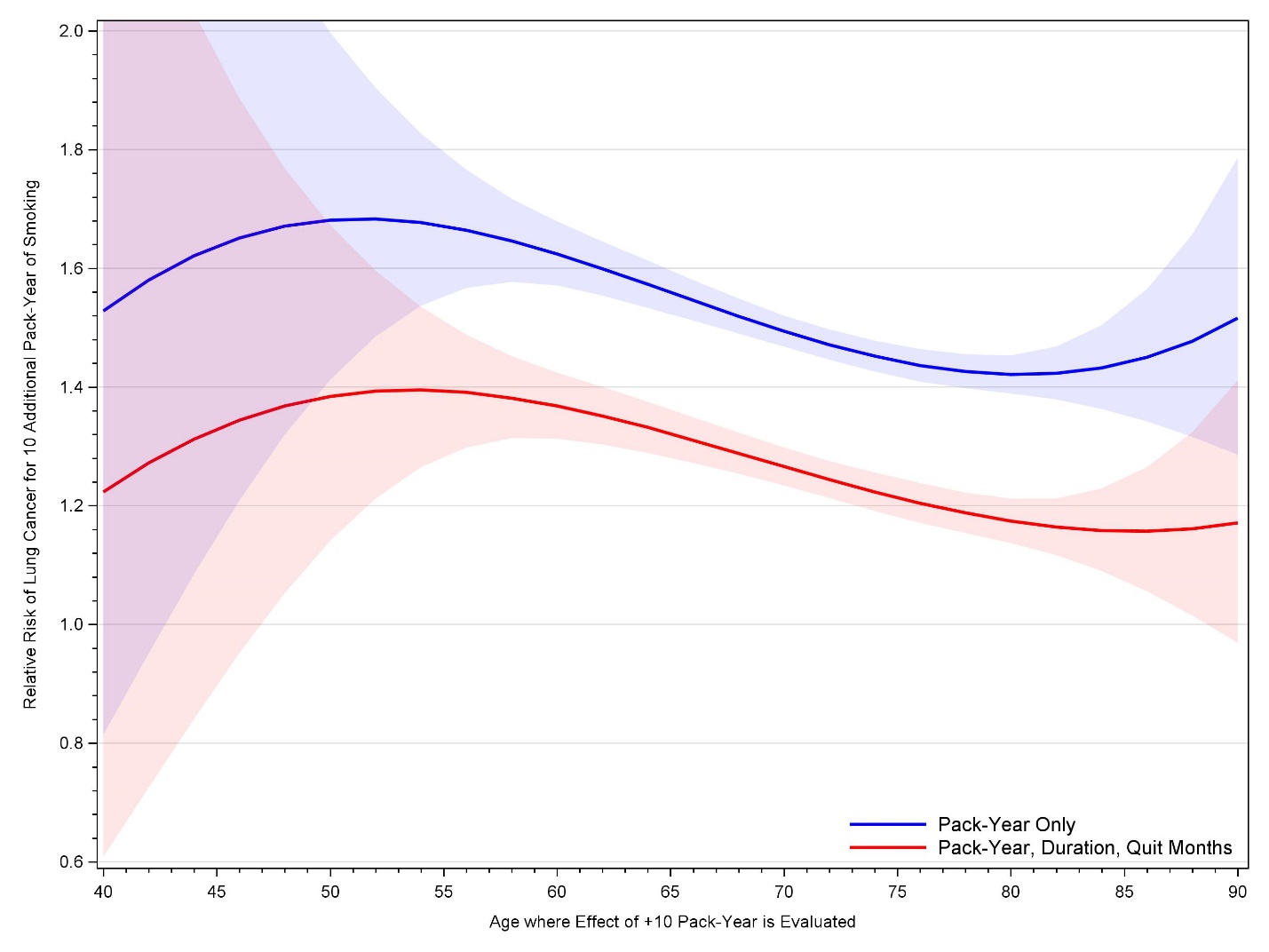
X2: chi-squared test statistic

P(X2): chi-squared p-value

HR: hazard ratio

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21796.11 | PM2.5 | 0.02450 | 0.08288 | 0.09 | 0.7676 | 1.025 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19734.78 | PM2.5 | 0.05487 | 0.08321 | 0.43 | 0.5092 | 1.056 |
|  |  |  | Current v Never | 3.25246 | 0.08446 | 1485.06 | <0.0001 | 25.910 |
|  |  |  | Former v Never | 1.86360 | 0.08077 | 532.29 | <0.0001 | 6.447 |
|  |  |  |  |  |  |  |  |  |
| 3. | 21810.08 | 18721.24 | PM2.5 | 0.07189 | 0.08421 | 0.73 | 0.3926 | 1.075 |
|  |  |  | Current v Never | 1.40518 | 0.10476 | 179.92 | <0.0001 | 4.076 |
|  |  |  | Former v Never | 0.96378 | 0.08774 | 120.65 | <0.0001 | 2.622 |
|  |  |  | Pack-Years | 0.03114 | 0.00092 | 1143.88 | <0.0001 | 1.032 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18550.32 | PM2.5 | 0.04568 | 0.08408 | 0.29 | 0.5869 | 1.047 |
|  |  |  | Current v Never | 0.18519 | 0.14328 | 1.67 | 0.1962 | 1.203 |
|  |  |  | Former v Never | 0.13206 | 0.11344 | 1.35 | 0.2444 | 1.142 |
|  |  |  | Pack-Years | 0.02220 | 0.00115 | 375.77 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03593 | 0.00277 | 168.11 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18545.49 | PM2.5 | 0.04449 | 0.08404 | 0.28 | 0.5966 | 1.045 |
|  |  |  | Current v Never | 0.72128 | 0.24607 | 8.59 | 0.0034 | 2.057 |
|  |  |  | Former v Never | 0.70898 | 0.24416 | 8.43 | 0.0037 | 2.032 |
|  |  |  | Pack-Years | 0.02241 | 0.00115 | 380.39 | <0.0001 | 1.023 |
|  |  |  | Years Smoked | 0.02507 | 0.00490 | 26.13 | <0.0001 | 1.025 |
|  |  |  | Months Quit | -0.00111 | 0.00042 | 7.02 | 0.0081 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 21810.08 | 18549.88 | PM2.5 | 0.04321 | 0.08408 | 0.26 | 0.6073 | 1.044 |
|  |  |  | Pack-Years | 0.02213 | 0.00114 | 377.31 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03823 | 0.00208 | 337.29 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00006 | 0.00018 | 0.10 | 0.7472 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 21810.08 | 18509.50 | PM2.5 | 0.04860 | 0.08401 | 0.33 | 0.5629 | 1.050 |
|  |  |  | Pack-Years | 0.07583 | 0.00832 | 83.08 | <0.0001 | 1.079 |
|  |  |  | Years Smoked | 0.03852 | 0.00207 | 346.63 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.07 | 0.7919 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00075 | 0.00011 | 41.98 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 21810.08 | 18511.49 | PM2.5 | 0.04863 | 0.08402 | 0.33 | 0.5627 | 1.050 |
|  |  |  | Pack-Years | 0.08019 | 0.06737 | 1.42 | 0.2340 | 1.083 |
|  |  |  | Years Smoked | 0.03851 | 0.00208 | 344.23 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.07 | 0.7906 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00087 | 0.00191 | 0.21 | 0.6481 | 0.999 |
|  |  |  | Pack-Yr-x-Age Squared | 8.79 e-7 | 0.00001 | 0.01 | 0.9479 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 21810.08 | 18512.86 | PM2.5 | 0.04935 | 0.08402 | 0.34 | 0.5570 | 1.051 |
|  |  |  | Pack-Years | -0.29710 | 0.47788 | 0.39 | 0.5341 | 0.743 |
|  |  |  | Years Smoked | 0.03848 | 0.00208 | 343.69 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.07 | 0.7859 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01560 | 0.02073 | 0.56 | 0.4519 | 1.016 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00030 | 0.63 | 0.4272 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.13e-6 | 1.42e-6 | 0.64 | 0.4249 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 21810.08 | 18878.51 | PM2.5 | 0.07681 | 0.08450 | 0.82 | 0.3633 | 1.080 |
|  |  |  | Pack-Years | -0.28666 | 0.42977 | 0.44 | 0.5048 | 0.751 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01678 | 0.01862 | 0.81 | 0.3674 | 1.017 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00027 | 0.00027 | 1.00 | 0.3163 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.35e-6 | 1.27e-6 | 1.13 | 0.2867 | 1.000 |

Based on Models 7C and 8, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown below in Figure S1.1.



**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1667.72 | PM2.5 | 0.21280 | 0.25937 | 0.67 | 0.4120 | 1.237 |
|  |  |  |  |  |  |  |  |  |

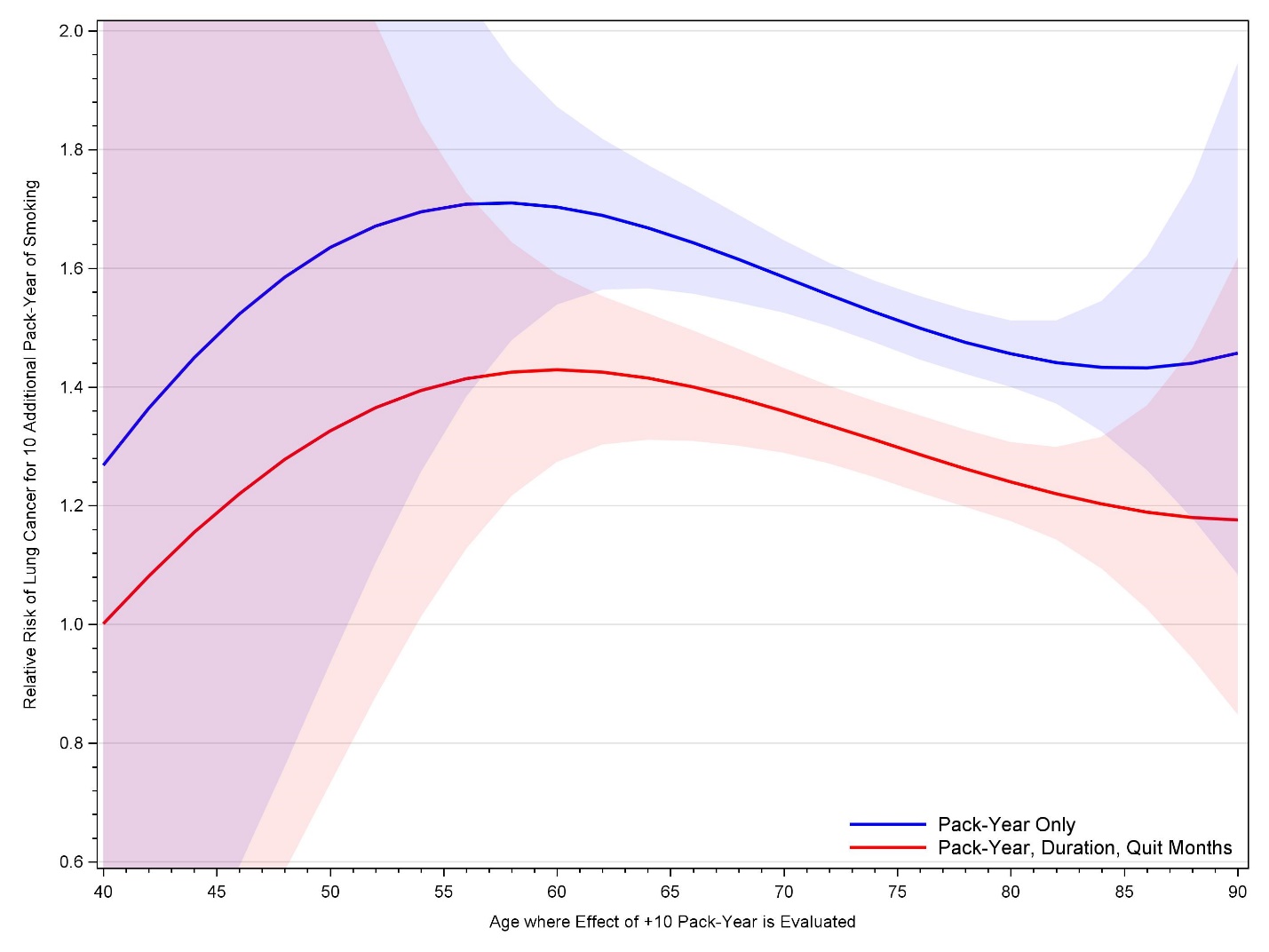
**Never or Former Smokers (Quit for ≥ 10 Years)**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted).

**Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8778.17 | PM2.5 | 0.13747 | 0.12787 | 1.15 | 0.2823 | 1.147 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8380.38 | PM2.5 | 0.23804 | 0.12841 | 3.43 | 0.0638 | 1.269 |
|  |  |  | Former v Never | 1.52086 | 0.08478 | 321.78 | <0.0001 | 4.576 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8778.12 | 7985.74 | PM2.5 | 0.27423 | 0.12979 | 4.46 | 0.0346 | 1.316 |
|  |  |  | Former v Never | 0.61646 | 0.10082 | 37.39 | <0.0001 | 1.852 |
|  |  |  | Pack-Years | 0.03611 | 0.00166 | 474.23 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 7943.16 | PM2.5 | 0.25853 | 0.12971 | 3.97 | 0.0462 | 1.295 |
|  |  |  | Former v Never | 0.09148 | 0.13298 | 0.47 | 0.4915 | 1.096 |
|  |  |  | Pack-Years | 0.02629 | 0.00222 | 139.91 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03046 | 0.00455 | 44.89 | <0.0001 | 1.031 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8778.12 | 7941.19 | PM2.5 | 0.25714 | 0.12966 | 3.93 | 0.0474 | 1.293 |
|  |  |  | Former v Never | 0.79522 | 0.37027 | 4.61 | 0.0317 | 2.215 |
|  |  |  | Pack-Years | 0.02650 | 0.00223 | 141.35 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.01791 | 0.00763 | 5.50 | 0.0190 | 1.018 |
|  |  |  | Months Quit | -0.00127 | 0.00063 | 4.09 | 0.0432 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8778.12 | 7938.30 | PM2.5 | 0.25975 | 0.12962 | 4.01 | 0.0451 | 1.297 |
|  |  |  | Former v Never | 0.51470 | 0.40055 | 1.65 | 0.1988 | 1.673 |
|  |  |  | Pack-Years | -0.61864 | 1.15181 | 0.29 | 0.5912 | 0.539 |
|  |  |  | Years Smoked | 0.02296 | 0.00807 | 8.10 | 0.0044 | 1.023 |
|  |  |  | Months Quit | -0.00083 | 0.00066 | 1.55 | 0.2117 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02743 | 0.04867 | 0.32 | 0.5731 | 1.028 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00037 | 0.00068 | 0.30 | 0.5824 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.65e-6 | 3.17e-6 | 0.27 | 0.6018 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 7943.62 | PM2.5 | 0.25568 | 0.12972 | 3.88 | 0.0487 | 1.291 |
|  |  |  | Pack-Years | 0.02617 | 0.00222 | 139.21 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03250 | 0.00352 | 85.20 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00001 | 0.00022 | 0.01 | 0.9618 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 7934.39 | PM2.5 | 0.25896 | 0.12963 | 3.99 | 0.0457 | 1.296 |
|  |  |  | Pack-Years | 0.08585 | 0.01770 | 23.52 | <0.0001 | 1.090 |
|  |  |  | Years Smoked | 0.03220 | 0.00351 | 84.09 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00003 | 0.00022 | 0.02 | 0.8821 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00080 | 0.00024 | 11.42 | 0.0007 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 7936.07 | PM2.5 | 0.25871 | 0.12962 | 3.98 | 0.0459 | 1.295 |
|  |  |  | Pack-Years | -0.00066 | 0.15634 | 0.01 | 0.9966 | 0.999 |
|  |  |  | Years Smoked | 0.03232 | 0.00352 | 84.41 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00003 | 0.00022 | 0.01 | 0.8997 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.00160 | 0.00430 | 0.14 | 0.7109 | 1.002 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00002 | 0.00003 | 0.31 | 0.5773 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 7937.90 | PM2.5 | 0.25916 | 0.12964 | 4.00 | 0.0456 | 1.296 |
|  |  |  | Pack-Years | -0.46144 | 1.13662 | 0.16 | 0.6848 | 0.630 |
|  |  |  | Years Smoked | 0.03229 | 0.00352 | 84.25 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00003 | 0.00022 | 0.01 | 0.9021 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02123 | 0.04811 | 0.19 | 0.6591 | 1.022 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00067 | 0.19 | 0.6643 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.29e-6 | 3.14e-6 | 0.17 | 0.6815 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8778.12 | 8015.37 | PM2.5 | 0.25804 | 0.12990 | 3.95 | 0.0470 | 1.294 |
|  |  |  | Pack-Years | -0.47213 | 1.06302 | 0.20 | 0.6569 | 0.624 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02359 | 0.04492 | 0.27 | 0.5995 | 1.024 |
|  |  |  | Pack-Yr-x-Age^2 | -0.00034 | 0.00063 | 0.30 | 0.5857 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.60e-6 | 2.93e-6 | 0.30 | 0.5848 | 1.000 |

Based on Models 7C and 8, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown below in Figure S1.2.

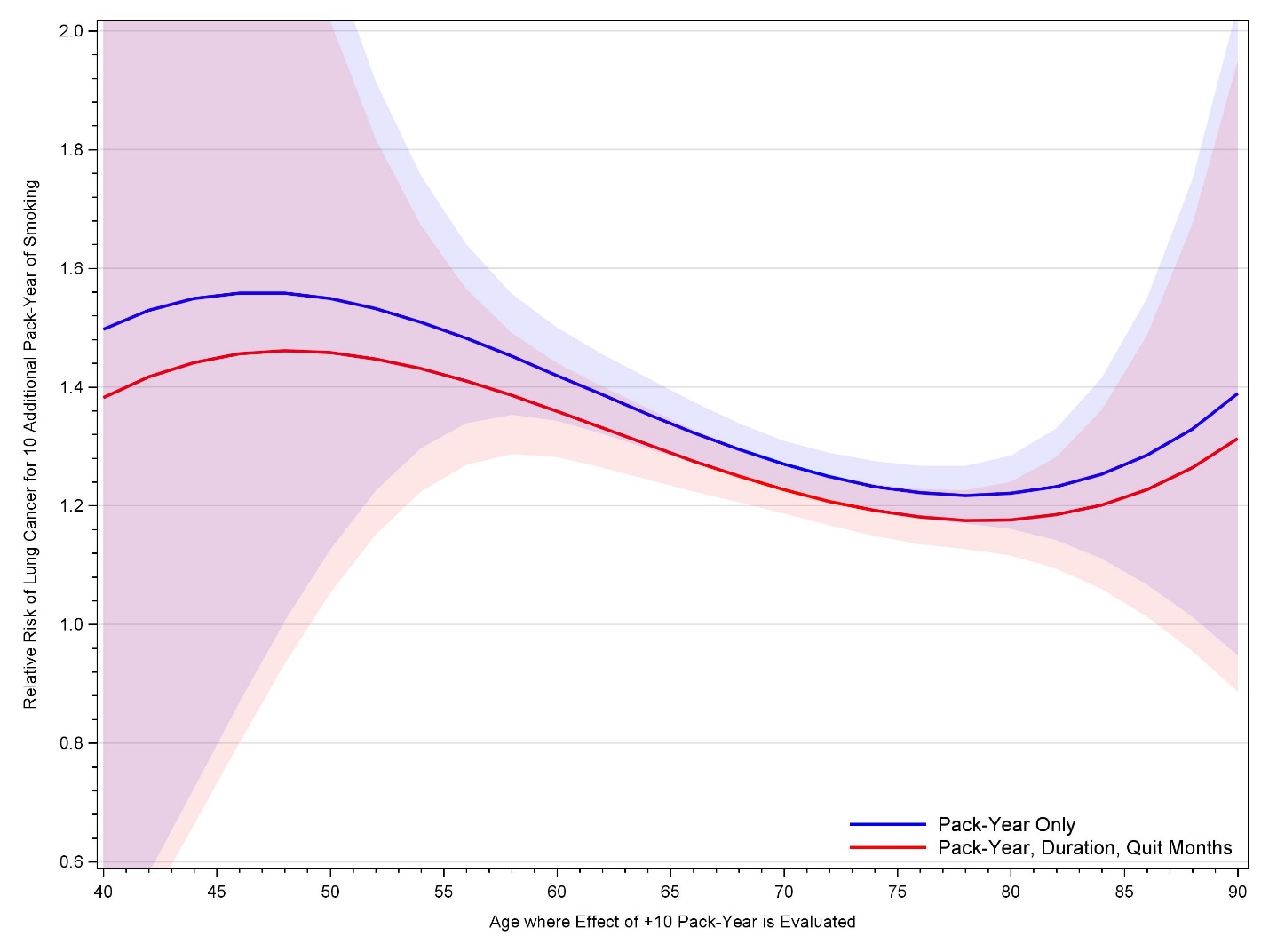


**Current or Former Smokers (Quit for < 10 Years)**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8449.35 | PM2.5 | -0.11339 | 0.11023 | 1.06 | 0.3036 | 0.893 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8396.00 | PM2.5 | -0.11709 | 0.11012 | 1.13 | 0.2876 | 0.890 |
|  |  |  | Current v Former | 0.45308 | 0.06170 | 53.92 | <0.0001 | 1.573 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8051.20 | PM2.5 | -0.08350 | 0.11193 | 0.56 | 0.4557 | 0.920 |
|  |  |  | Current v Former | 0.18820 | 0.06369 | 8.73 | 0.0031 | 1.207 |
|  |  |  | Pack-Years | 0.02381 | 0.00126 | 359.78 | <0.0001 | 1.024 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8024.52 | PM2.5 | -0.08565 | 0.11186 | 0.59 | 0.4439 | 0.918 |
|  |  |  | Current v Former | 0.03266 | 0.07032 | 0.21 | 0.6423 | 1.033 |
|  |  |  | Pack-Years | 0.02086 | 0.00137 | 230.61 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03318 | 0.00652 | 25.84 | <0.0001 | 1.034 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8454.28 | 8025.98 | PM2.5 | -0.08578 | 0.11188 | 0.59 | 0.4432 | 0.918 |
|  |  |  | Current v Former | 0.08729 | 0.10315 | 0.72 | 0.3974 | 1.091 |
|  |  |  | Pack-Years | 0.02084 | 0.00137 | 229.82 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03481 | 0.00695 | 25.09 | <0.0001 | 1.035 |
|  |  |  | Months Quit | 0.00111 | 0.00151 | 0.54 | 0.4630 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8454.28 | 8016.76 | PM2.5 | -0.07991 | 0.11170 | 0.51 | 0.4744 | 0.923 |
|  |  |  | Current v Former | 0.08695 | 0.10306 | 0.71 | 0.3988 | 1.091 |
|  |  |  | Pack-Years | -0.32337 | 0.88489 | 0.13 | 0.7148 | 0.724 |
|  |  |  | Years Smoked | 0.03338 | 0.00691 | 23.34 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00111 | 0.00150 | 0.54 | 0.4614 | 1.001 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01866 | 0.03869 | 0.23 | 0.6269 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00056 | 0.30 | 0.5803 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.62e-6 | 2.69e-6 | 0.36 | 0.5468 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8024.71 | PM2.5 | -0.08506 | 0.11188 | 0.58 | 0.4471 | 0.918 |
|  |  |  | Pack-Years | 0.02088 | 0.00137 | 231.16 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03508 | 0.00694 | 25.53 | <0.0001 | 1.021 |
|  |  |  | Months Quit | 0.00018 | 0.00104 | 0.03 | 0.8647 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8013.19 | PM2.5 | -0.07928 | 0.11171 | 0.50 | 0.4779 | 0.924 |
|  |  |  | Pack-Years | 0.07210 | 0.01397 | 26.63 | <0.0001 | 1.075 |
|  |  |  | Years Smoked | 0.03403 | 0.00689 | 24.40 | <0.0001 | 1.035 |
|  |  |  | Months Quit | 0.00021 | 0.00103 | 0.04 | 0.8357 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00071 | 0.00020 | 13.54 | 0.0002 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8013.83 | PM2.5 | -0.07930 | 0.11171 | 0.50 | 0.4777 | 0.924 |
|  |  |  | Pack-Years | 0.20586 | 0.11525 | 3.19 | 0.0741 | 1.229 |
|  |  |  | Years Smoked | 0.03368 | 0.00690 | 23.82 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00019 | 0.00103 | 0.03 | 0.8531 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00458 | 0.00331 | 1.92 | 0.1660 | 0.995 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00003 | 0.00002 | 1.37 | 0.2424 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8015.48 | PM2.5 | -0.07936 | 0.11170 | 0.50 | 0.4774 | 0.924 |
|  |  |  | Pack-Years | -0.31219 | 0.88475 | 0.12 | 0.7242 | 0.731 |
|  |  |  | Years Smoked | 0.03365 | 0.00690 | 23.75 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00018 | 0.00103 | 0.03 | 0.8599 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01818 | 0.03869 | 0.22 | 0.6384 | 1.018 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00030 | 0.00056 | 0.29 | 0.5887 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.59e-6 | 2.69e-6 | 0.35 | 0.5549 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8454.28 | 8045.81 | PM2.5 | -0.07441 | 0.11183 | 0.44 | 0.5058 | 0.928 |
|  |  |  | Pack-Years | -0.30311 | 0.86611 | 0.12 | 0.7264 | 0.739 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01844 | 0.03786 | 0.24 | 0.6263 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00055 | 0.33 | 0.5678 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.67e-6 | 2.63e-6 | 0.40 | 0.5268 | 1.000 |

Based on Models 7C and 8, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown below in Figure S1.3.

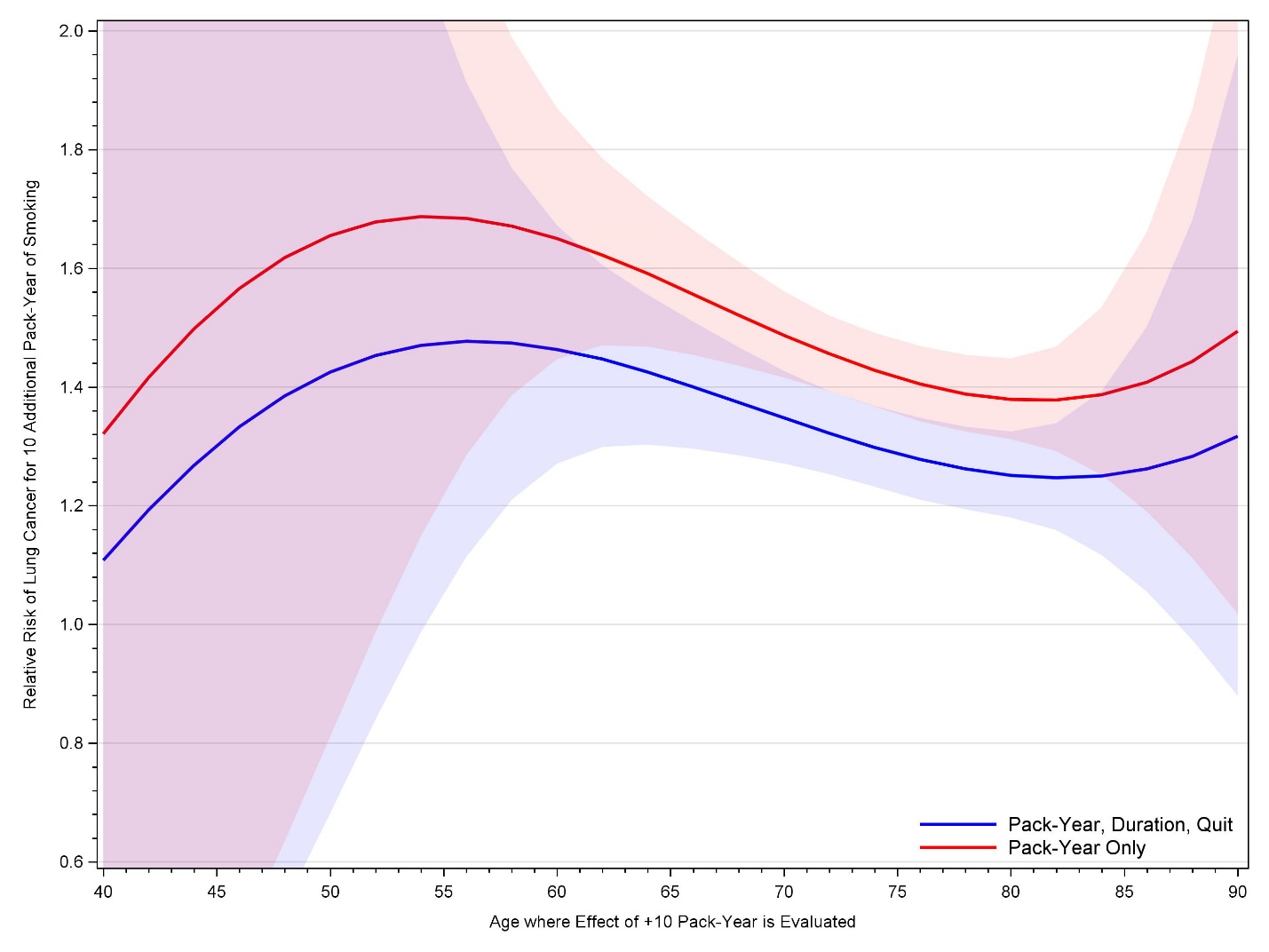


**Former Smokers Only (Quit for ≥ 10 Years)**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5848.00 | PM2.5 | 0.27027 | 0.14831 | 3.32 | 0.0684 | 1.310 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5455.74 | PM2.5 | 0.31600 | 0.15076 | 4.39 | 0.0361 | 1.372 |
|  |  |  | Pack-Years | 0.03639 | 0.00169 | 463.50 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5409.75 | PM2.5 | 0.29598 | 0.15063 | 3.86 | 0.0494 | 1.344 |
|  |  |  | Pack-Years | 0.02625 | 0.00224 | 137.18 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03248 | 0.00469 | 47.86 | <0.0001 | 1.033 |
|  |  |  |  |  |  |  |  |  |
| 4. | 5845.55 | 5410.97 | PM2.5 | 0.29536 | 0.15060 | 3.85 | 0.0499 | 1.344 |
|  |  |  | Pack-Years | 0.02636 | 0.00225 | 137.76 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.02506 | 0.00947 | 7.00 | 0.0081 | 1.025 |
|  |  |  | Months Quit | -0.00069 | 0.00077 | 0.80 | 0.3700 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 5845.55 | 5406.99 | PM2.5 | 0.29734 | 0.15050 | 3.90 | 0.0482 | 1.346 |
|  |  |  | Pack-Years | 0.08113 | 0.02233 | 13.20 | 0.0003 | 1.085 |
|  |  |  | Years Smoked | 0.02373 | 0.00942 | 6.34 | 0.0118 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.98 | 0.3225 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00073 | 0.00030 | 6.04 | 0.0139 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 5845.55 | 5408.91 | PM2.5 | 0.29748 | 0.15050 | 3.91 | 0.0481 | 1.346 |
|  |  |  | Pack-Years | 0.13536 | 0.19843 | 0.46 | 0.4952 | 1.145 |
|  |  |  | Years Smoked | 0.02368 | 0.00943 | 6.31 | 0.0120 | 1.024 |
|  |  |  | Months Quit | -0.00075 | 0.00077 | 0.98 | 0.3232 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00223 | 0.00546 | 0.17 | 0.6826 | 0.998 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00001 | 0.00004 | 0.072 | 0.7834 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 5C. | 5845.55 | 5410.70 | PM2.5 | 0.29849 | 0.15056 | 3.93 | 0.0475 | 1.348 |
|  |  |  | Pack-Years | -0.49706 | 1.40705 | 0.12 | 0.7239 | 0.608 |
|  |  |  | Years Smoked | 0.02362 | 0.00943 | 6.28 | 0.0122 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.98 | 0.3214 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02467 | 0.05948 | 0.17 | 0.6783 | 1.025 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00037 | 0.00083 | 0.19 | 0.6587 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.76e-6 | 3.88e-6 | 0.21 | 0.6493 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 5845.55 | 5453.66 | PM2.5 | 0.31966 | 0.15074 | 4.50 | 0.0340 | 1.377 |
|  |  |  | Pack-Years | -0.49905 | 1.36033 | 0.13 | 0.7137 | 0.607 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02615 | 0.05746 | 0.21 | 0.6491 | 1.026 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00040 | 0.00080 | 0.25 | 0.6181 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.97e-6 | 3.74e-6 | 0.28 | 0.5989 | 1.000 |

Based on Models 5C and 6, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown below in Figure S1.4.



**Section 2: Models using average packs**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,807.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21796.11 | PM2.5 | 0.02450 | 0.08288 | 0.08 | 0.7676 | 1.025 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19734.78 | PM2.5 | 0.05487 | 0.08312 | 0.43 | 0.5092 | 1.056 |
|  |  |  | Current v Never | 3.25462 | 0.08446 | 1485.06 | <0.0001 | 25.910 |
|  |  |  | Former v Never | 1.86360 | 0.08077 | 532.29 | <0.0001 | 6.447 |
|  |  |  |  |  |  |  |  |  |
| 3. | 21810.08 | 18872.12 | PM2.5 | 0.01521 | 0.08348 | 0.03 | 0.8554 | 1.015 |
|  |  |  | Current v Never | -0.30144 | 0.15981 | 3.56 | 0.0593 | 0.740 |
|  |  |  | Former v Never | -0.38231 | 0.12934 | 8.74 | 0.0031 | 0.682 |
|  |  |  | Average Packs | 1.00686 | 0.13990 | 51.80 | <0.0001 | 2.737 |
|  |  |  | Years Smoked | 0.06871 | 0.00252 | 741.28 | <0.0001 | 1.071 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18870.31 | PM2.5 | 0.01447 | 0.08345 | 0.03 | 0.8624 | 1.015 |
|  |  |  | Current v Never | 0.08224 | 0.25023 | 0.11 | 0.7424 | 1.086 |
|  |  |  | Former v Never | 0.03318 | 0.24604 | 0.02 | 0.8927 | 1.034 |
|  |  |  | Average Packs | 1.03443 | 0.14024 | 54.41 | <0.0001 | 2.813 |
|  |  |  | Years Smoked | 0.06100 | 0.00461 | 174.95 | <0.0001 | 1.063 |
|  |  |  | Months Quit | -0.00083 | 0.00042 | 3.90 | 0.0484 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18866.94 | PM2.5 | 0.01485 | 0.08346 | 0.03 | 0.8588 | 1.015 |
|  |  |  | Average Packs | 1.06051 | 0.13423 | 62.42 | <0.0001 | 2.888 |
|  |  |  | Years Smoked | 0.06213 | 0.00153 | 1638.30 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00085 | 0.00020 | 17.25 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6A. | 21810.08 | 18868.59 | PM2.5 | 0.01497 | 0.08347 | 0.03 | 0.8576 | 1.015 |
|  |  |  | Average Packs | 0.45229 | 1.02969 | 0.19 | 0.6605 | 1.572 |
|  |  |  | Years Smoked | 0.06209 | 0.00154 | 1633.56 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.56 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00897 | 0.01459 | 0.36 | 0.5487 | 1.009 |
|  |  |  |  |  |  |  |  |  |
| 6B. | 21810.08 | 18869.28 | PM2.5 | 0.01544 | 0.08346 | 0.03 | 0.8533 | 1.016 |
|  |  |  | Average Packs | 3.23904 | 2.63085 | 1.52 | 0.2183 | 25.509 |
|  |  |  | Years Smoked | 0.06207 | 0.00154 | 1632.16 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.66 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.07681 | 0.07632 | 1.01 | 0.3137 | 0.926 |
|  |  |  | Ave Pck-x-Age Squared | 0.00065 | 0.00057 | 1.32 | 0.2510 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 6C. | 21810.31 | 18870.50 | PM2.5 | 0.01582 | 0.08346 | 0.03 | 0.8496 | 1.016 |
|  |  |  | Average Packs | 1.60822 | 3.36717 | 0.23 | 0.6329 | 4.994 |
|  |  |  | Years Smoked | 0.06207 | 0.00154 | 1631.48 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.67 | <0.0001 | 0.999 |
|  |  |  | Yrs Smk-x-Age (Yrs) | -0.10244 | 0.08199 | 1.56 | 0.2115 | 0.903 |
|  |  |  | Yrs Smk-x-Age Squared | 0.00246 | 0.00217 | 1.28 | 0.2579 | 1.002 |
|  |  |  | Yrs Smk-x-Age Cubed | -0.00002 | 0.00002 | 0.73 | 0.3931 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up

(records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1667.72 | PM2.5 | 0.21280 | 0.25937 | 0.67 | 0.4120 | 1.237 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years)**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8778.17 | PM2.5 | 0.13747 | 0.12787 | 1.16 | 0.2823 | 1.147 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8380.38 | PM2.5 | 0.23804 | 0.12841 | 3.43 | 0.0638 | 1.269 |
|  |  |  | Former v Never | 1.52086 | 0.08478 | 321.78 | <0.0001 | 4.576 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8778.12 | 8067.05 | PM2.5 | 0.21769 | 0.12882 | 2.85 | 0.0911 | 1.243 |
|  |  |  | Former v Never | -0.25613 | 0.16193 | 2.50 | 0.1137 | 0.774 |
|  |  |  | Average Packs | 0.61527 | 0.19824 | 9.63 | 0.0019 | 1.850 |
|  |  |  | Years Smoked | 0.06493 | 0.00399 | 264.90 | <0.0001 | 1.067 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 8067.56 | PM2.5 | 0.22239 | 0.12876 | 2.98 | 0.0841 | 1.249 |
|  |  |  | Average Packs | 0.42648 | 0.16989 | 6.30 | 0.0121 | 1.532 |
|  |  |  | Years Smoked | 0.05980 | 0.00231 | 667.66 | <0.0001 | 1.062 |
|  |  |  |  |  |  |  |  |  |
| 5. | 8778.12 | 8066.27 | PM2.5 | 0.21609 | 0.12879 | 2.81 | 0.0934 | 1.241 |
|  |  |  | Former v Never | 0.32174 | 0.37675 | 0.73 | 0.3931 | 1.380 |
|  |  |  | Average Packs | 0.62720 | 0.19851 | 9.98 | 0.0016 | 1.872 |
|  |  |  | Years Smoked | 0.05484 | 0.00713 | 59.21 | <0.0001 | 1.056 |
|  |  |  | Months Quit | -0.00106 | 0.00063 | 2.85 | 0.0913 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 8064.99 | PM2.5 | 0.21578 | 0.12881 | 2.81 | 0.0939 | 1.241 |
|  |  |  | Average Packs | 0.66352 | 0.19153 | 12.00 | 0.0005 | 1.942 |
|  |  |  | Years Smoked | 0.06061 | 0.00231 | 689.63 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00057 | 0.00027 | 4.51 | 0.0337 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 8066.97 | PM2.5 | 0.21583 | 0.12882 | 2.81 | 0.0938 | 1.241 |
|  |  |  | Average Packs | 0.48911 | 1.36217 | 0.13 | 0.7195 | 1.631 |
|  |  |  | Years Smoked | 0.06061 | 0.00231 | 689.72 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.50 | 0.0338 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00255 | 0.01966 | 0.02 | 0.8969 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 8066.80 | PM2.5 | 0.21525 | 0.12883 | 2.79 | 0.0948 | 1.240 |
|  |  |  | Average Packs | 6.23565 | 4.06984 | 2.35 | 0.1255 | 510.631 |
|  |  |  | Years Smoked | 0.06057 | 0.00231 | 688.38 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.55 | 0.0330 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.17255 | 0.11933 | 2.09 | 0.1482 | 0.842 |
|  |  |  | Ave Pck-x-Age Squared | 0.00131 | 0.00088 | 2.21 | 0.1373 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 8068.07 | PM2.5 | 0.21547 | 0.12882 | 2.80 | 0.0944 | 1.240 |
|  |  |  | Average Packs | 5.07786 | 4.53230 | 1.26 | 0.2626 | 160.430 |
|  |  |  | Years Smoked | 0.06055 | 0.00231 | 687.43 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.62 | 0.0315 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22833 | 0.13701 | 2.78 | 0.0956 | 0.796 |
|  |  |  | Ave Pck-x-Age Squared | 0.00370 | 0.00297 | 1.55 | 0.2133 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.69 | 0.4064 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Current or Former Smokers (Quit for < 10 Years)**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8449.35 | PM2.5 | -0.11339 | 0.11023 | 1.06 | 0.3036 | 0.893 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8396.00 | PM2.5 | -0.11709 | 0.11012 | 1.13 | 0.2876 | 0.890 |
|  |  |  | Current v Former | 0.45308 | 0.06170 | 53.92 | <0.0001 | 1.573 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8150.20 | PM2.5 | -0.10276 | 0.11075 | 0.86 | 0.3535 | 0.902 |
|  |  |  | Current v Former | -0.03960 | 0.07057 | 0.31 | 0.0031 | 1.207 |
|  |  |  | Average Packs | 3.62559 | 0.28181 | 165.52 | <0.0001 | 37.547 |
|  |  |  | Years Smoked | 0.08459 | 0.00652 | 168.14 | <0.0001 | 1.088 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8148.87 | PM2.5 | -0.10329 | 0.11073 | 0.87 | 0.3509 | 0.902 |
|  |  |  | Average Packs | 3.57753 | 0.26784 | 178.41 | <0.0001 | 35.785 |
|  |  |  | Years Smoked | 0.08284 | 0.00570 | 210.97 | <0.0001 | 1.086 |
|  |  |  |  |  |  |  |  |  |
| 5. | 8454.28 | 8148.65 | PM2.5 | -0.10260 | 0.11082 | 0.86 | 0.3545 | 0.902 |
|  |  |  | Current v Former | 0.10343 | 0.10279 | 1.01 | 0.3143 | 1.109 |
|  |  |  | Average Packs | 3.74120 | 0.29053 | 165.82 | <0.0001 | 42.149 |
|  |  |  | Years Smoked | 0.08960 | 0.00713 | 157.84 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00300 | 0.00152 | 3.91 | 0.0479 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8147.67 | PM2.5 | -0.10201 | 0.11081 | 0.85 | 0.3573 | 0.903 |
|  |  |  | Average Packs | 3.76147 | 0.28993 | 168.32 | <0.0001 | 43.012 |
|  |  |  | Years Smoked | 0.09005 | 0.00712 | 159.98 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00191 | 0.00106 | 3.22 | 0.0727 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8149.51 | PM2.5 | -0.10295 | 0.11086 | 0.86 | 0.3531 | 0.902 |
|  |  |  | Average Packs | 2.72560 | 2.58222 | 1.11 | 0.2912 | 15.266 |
|  |  |  | Years Smoked | 0.09027 | 0.00715 | 159.60 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00193 | 0.00106 | 3.29 | 0.0696 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01532 | 0.03738 | 0.16 | 0.6858 | 1.015 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8150.92 | PM2.5 | -0.10266 | 0.11085 | 0.86 | 0.3544 | 0.902 |
|  |  |  | Average Packs | 4.82175 | 3.76076 | 1.64 | 0.1998 | 124.182 |
|  |  |  | Years Smoked | 0.09044 | 0.00716 | 159.75 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00196 | 0.00106 | 3.38 | 0.0658 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.05782 | 0.10256 | 0.32 | 0.5729 | 0.944 |
|  |  |  | Ave Pck-x-Age Squared | 0.00062 | 0.00080 | 0.59 | 0.4452 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8150.92 | PM2.5 | -0.10112 | 0.11089 | 0.83 | 0.3618 | 0.904 |
|  |  |  | Average Packs | 15.37467 | 9.13814 | 2.83 | 0.0925 | >999.9 |
|  |  |  | Years Smoked | 0.09044 | 0.00714 | 160.62 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00193 | 0.00106 | 3.30 | 0.0691 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.04260 | 0.10328 | 0.17 | 0.6800 | 0.958 |
|  |  |  | Ave Pck-x-Age Squared | -0.00679 | 0.00592 | 1.31 | 0.2516 | 0.993 |
|  |  |  | Ave Pck-x-Age Cubed | 0.00007 | 0.00006 | 1.59 | 0.2062 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Former Smokers Only (Quit for ≥ 10 Years)**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5848.00 | PM2.5 | 0.27027 | 0.14831 | 3.32 | 0.0684 | 1.310 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5531.80 | PM2.5 | 0.24212 | 0.14918 | 2.63 | 0.1046 | 1.274 |
|  |  |  | Average Packs | 0.61231 | 0.20004 | 9.37 | 0.0022 | 1.845 |
|  |  |  | Years Smoked | 0.06718 | 0.00415 | 261.51 | <0.0001 | 1.069 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5533.57 | PM2.5 | 0.24158 | 0.14917 | 2.62 | 0.1053 | 1.273 |
|  |  |  | Average Packs | 0.61654 | 0.20009 | 9.49 | 0.0021 | 1.853 |
|  |  |  | Years Smoked | 0.06331 | 0.00903 | 49.12 | <0.0001 | 1.065 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6306 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 4A. | 5845.55 | 5535.00 | PM2.5 | 0.24233 | 0.14921 | 2.64 | 0.1044 | 1.274 |
|  |  |  | Average Packs | -0.53593 | 1.56561 | 0.12 | 0.7321 | 0.585 |
|  |  |  | Years Smoked | 0.06371 | 0.00904 | 49.72 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6298 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01666 | 0.02221 | 0.56 | 0.4532 | 1.017 |
|  |  |  |  |  |  |  |  |  |
| 4B. | 5845.55 | 5533.85 | PM2.5 | 0.24034 | 0.14923 | 2.59 | 0.1073 | 1.272 |
|  |  |  | Average Packs | 6.53383 | 4.20348 | 2.42 | 0.1201 | 688.027 |
|  |  |  | Years Smoked | 0.06372 | 0.00903 | 49.74 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00036 | 0.00077 | 0.22 | 0.6385 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.19837 | 0.12187 | 2.65 | 0.1036 | 0.820 |
|  |  |  | Ave Pck-x-Age Squared | 0.00161 | 0.00089 | 3.21 | 0.0732 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 4C. | 5845.55 | 5535.70 | PM2.5 | 0.24082 | 0.14923 | 2.60 | 0.1066 | 1.272 |
|  |  |  | Average Packs | 5.90327 | 4.62480 | 1.63 | 0.2018 | 366.235 |
|  |  |  | Years Smoked | 0.06370 | 0.00903 | 49.76 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6330 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22274 | 0.13748 | 2.62 | 0.1052 | 0.800 |
|  |  |  | Yrs Smk-x-Age Squared | 0.00272 | 0.00302 | 0.81 | 0.3678 | 1.000 |
|  |  |  | Yrs Smk-x-Age Cubed | -8.93 e-6 | 0.00002 | 0.14 | 0.7011 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**APPENDIX 2: Fully adjusted models**

**Section 1: Models using pack-years**

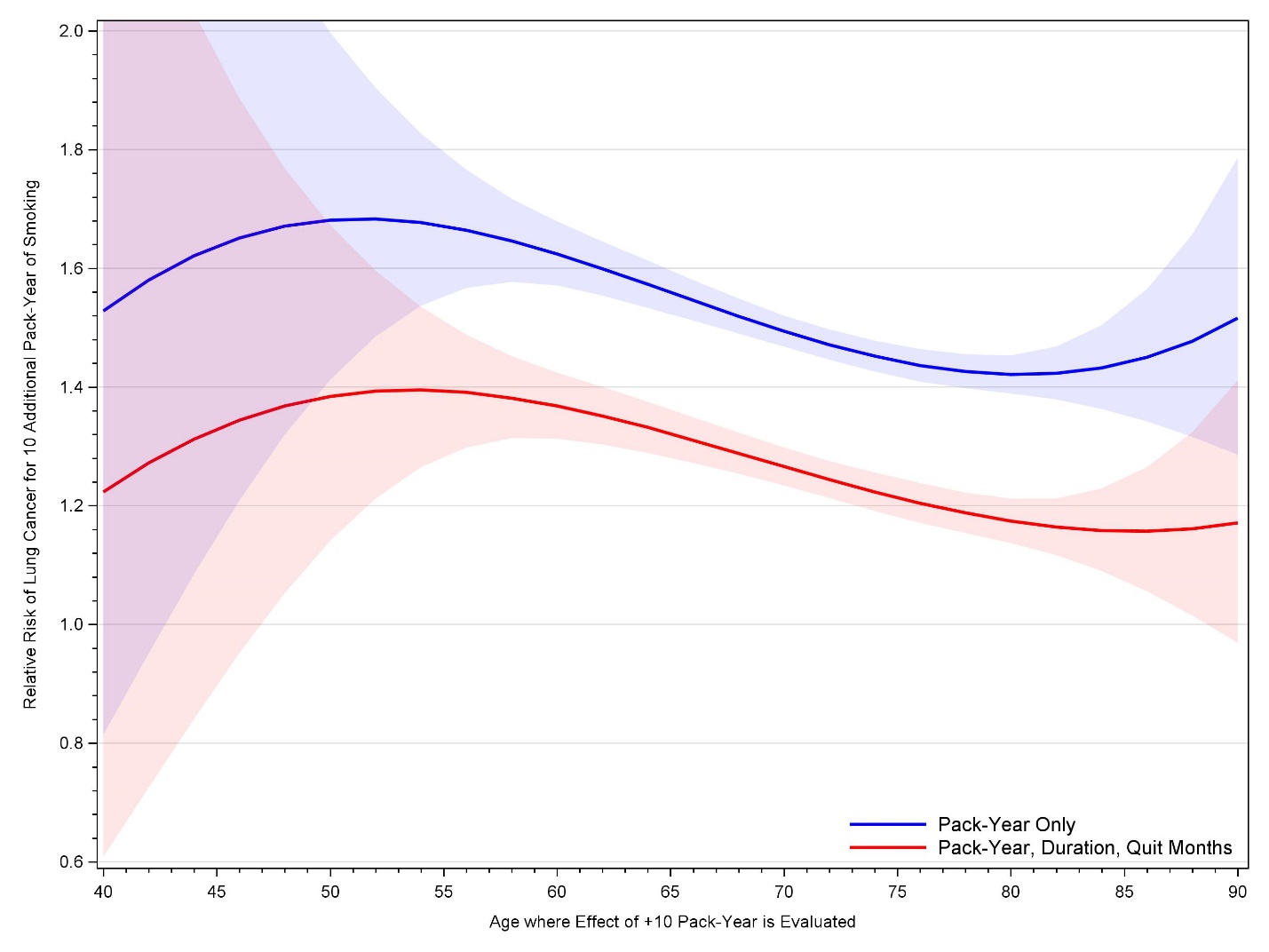
97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,807.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

**Additional covariates included in fully adjusted models:**

* **Median house value in census tract**
* **Median household income in census tract**
* **Body mass index**
* **Overall diet quality**
* **Alcohol consumption**
* **Physical activity**
* **Secondhand smoke from parent in childhood**
* **Secondhand smoke at home**
* **Secondhand smoke at work**
* **Duration of secondhand smoke at home**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21096.64 | PM2.5 | 0.06476 | 0.08400 | 0.59 | 0.4407 | 1.067 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19610.10 | PM2.5 | 0.06033 | 0.08404 | 0.51 | 0.4728 | 1.062 |
|  |  |  | Current v Never | 2.95759 | 0.08867 | 1112.57 | <0.0001 | 19.252 |
|  |  |  | Former v Never | 1.75807 | 0.08273 | 451.57 | <0.0001 | 5.801 |
|  |  |  |  |  |  |  |  |  |
| 3. | 21810.08 | 18705.14 | PM2.5 | 0.08226 | 0.08515 | 0.93 | 0.3340 | 1.086 |
|  |  |  | Current v Never | 1.29373 | 0.10718 | 145.69 | <0.0001 | 3.646 |
|  |  |  | Former v Never | 0.92230 | 0.08988 | 105.29 | <0.0001 | 2.515 |
|  |  |  | Pack-Years | 0.03039 | 0.00096 | 1005.85 | <0.0001 | 1.031 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18549.61 | PM2.5 | 0.05500 | 0.08502 | 0.42 | 0.5177 | 1.057 |
|  |  |  | Current v Never | 0.12926 | 0.14509 | 0.79 | 0.3730 | 1.138 |
|  |  |  | Former v Never | 0.11647 | 0.11570 | 1.01 | 0.3141 | 1.124 |
|  |  |  | Pack-Years | 0.02211 | 0.00116 | 361.76 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03481 | 0.00281 | 153.52 | <0.0001 | 1.035 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18545.16 | PM2.5 | 0.05392 | 0.08499 | 0.40 | 0.5258 | 1.055 |
|  |  |  | Current v Never | 0.65219 | 0.24776 | 6.93 | 0.0085 | 1.920 |
|  |  |  | Former v Never | 0.67913 | 0.24592 | 7.62 | 0.0058 | 1.972 |
|  |  |  | Pack-Years | 0.02233 | 0.00117 | 366.31 | <0.0001 | 1.023 |
|  |  |  | Years Smoked | 0.02425 | 0.00493 | 24.20 | <0.0001 | 1.025 |
|  |  |  | Months Quit | -0.00108 | 0.00042 | 6.62 | 0.0101 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 21810.08 | 18548.57 | PM2.5 | 0.05263 | 0.08502 | 0.38 | 0.5359 | 1.054 |
|  |  |  | Pack-Years | 0.02202 | 0.00116 | 361.87 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03638 | 0.00214 | 289.93 | <0.0001 | 1.037 |
|  |  |  | Months Quit | -0.00004 | 0.00018 | 0.05 | 0.8224 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 21778.31 | 18491.76 | PM2.5 | 0.05603 | 0.08499 | 0.43 | 0.5097 | 1.058 |
|  |  |  | Pack-Years | 0.07379 | 0.00836 | 77.99 | <0.0001 | 1.077 |
|  |  |  | Years Smoked | 0.03676 | 0.00212 | 299.57 | <0.0001 | 1.037 |
|  |  |  | Months Quit | -0.00003 | 0.00018 | 0.04 | 0.8496 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00072 | 0.00011 | 38.76 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 21778.31 | 18493.76 | PM2.5 | 0.05603 | 0.08499 | 0.43 | 0.5098 | 1.058 |
|  |  |  | Pack-Years | 0.07357 | 0.06746 | 1.19 | 0.2755 | 1.076 |
|  |  |  | Years Smoked | 0.03676 | 0.00213 | 297.94 | <0.0001 | 1.037 |
|  |  |  | Months Quit | -0.00003 | 0.00018 | 0.03 | 0.8497 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00071 | 0.00191 | 0.14 | 0.7088 | 0.999 |
|  |  |  | Pack-Yr-x-Age Squared | 4.51 e-8 | 0.00001 | 0.01 | 0.9973 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 21778.31 | 18495.19 | PM2.5 | 0.05667 | 0.08500 | 0.44 | 0.5050 | 1.058 |
|  |  |  | Pack-Years | -0.28488 | 0.47874 | 0.35 | 0.5518 | 0.752 |
|  |  |  | Years Smoked | 0.03674 | 0.00213 | 297.55 | <0.0001 | 1.037 |
|  |  |  | Months Quit | -0.00004 | 0.00018 | 0.04 | 0.8451 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01493 | 0.02076 | 0.52 | 0.4722 | 1.015 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00022 | 0.00030 | 0.57 | 0.4496 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.07e-6 | 1.42e-6 | 0.57 | 0.4492 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 21778.31 | 18810.61 | PM2.5 | 0.09163 | 0.08544 | 1.15 | 0.2836 | 1.096 |
|  |  |  | Pack-Years | -0.26558 | 0.43551 | 0.37 | 0.5420 | 0.767 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01551 | 0.01886 | 0.67 | 0.4111 | 1.016 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00025 | 0.00027 | 0.83 | 0.3632 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.23e-6 | 1.28e-6 | 0.92 | 0.3364 | 1.000 |

Based on Models 7C and 8, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown in Figure S2.1.



**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up. **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

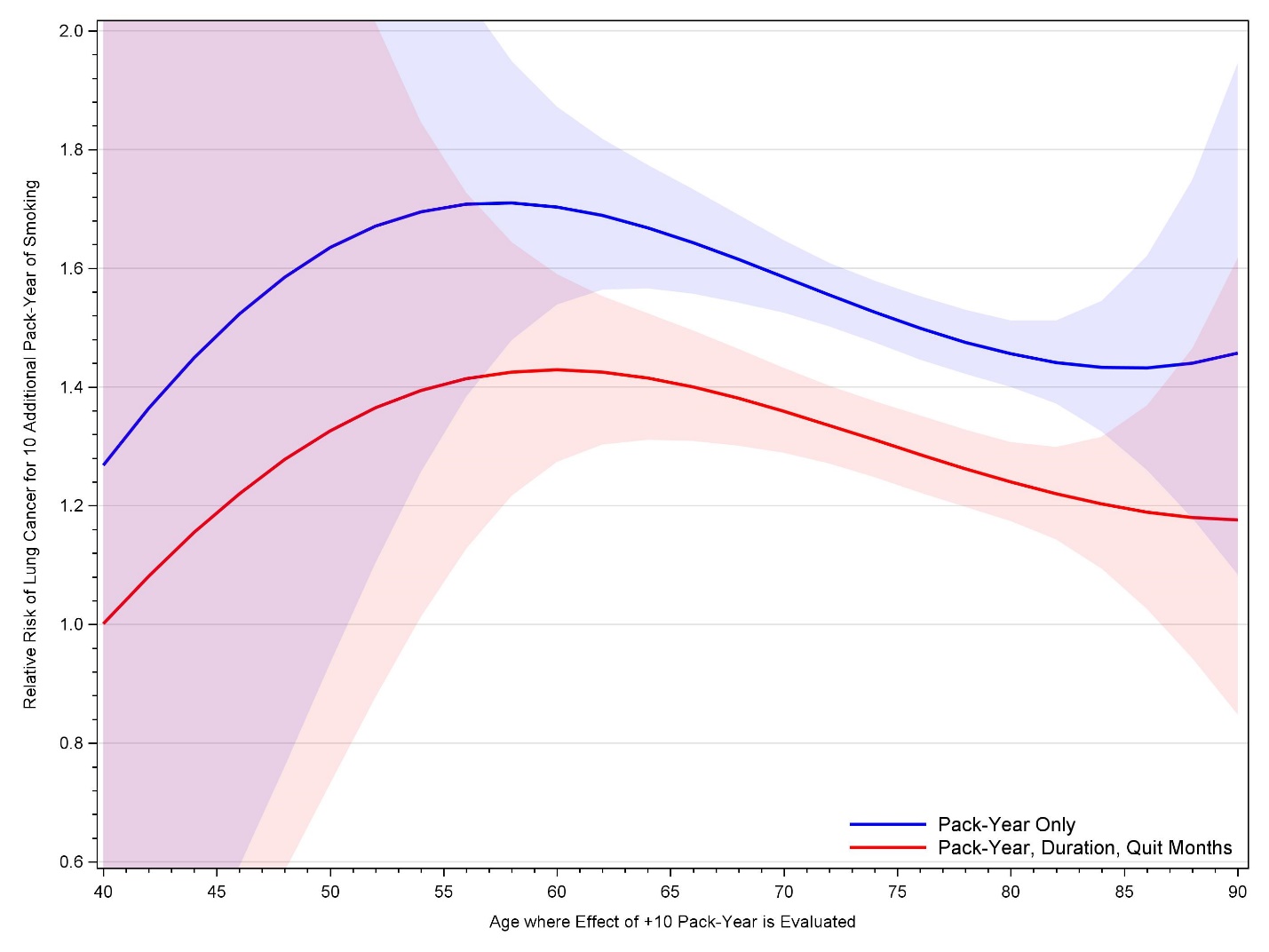
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1687.59 | PM2.5 | 0.23889 | 0.26052 | 0.84 | 0.3592 | 1.270 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years)**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8768.15 | 8646.85 | PM2.5 | 0.18170 | 0.12972 | 1.96 | 0.1613 | 1.199 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8768.15 | 8340.71 | PM2.5 | 0.23938 | 0.12996 | 3.39 | 0.0655 | 1.270 |
|  |  |  | Former v Never | 1.41410 | 0.08850 | 255.30 | <0.0001 | 4.113 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8768.15 | 7984.418 | PM2.5 | 0.28349 | 0.13130 | 4.66 | 0.0308 | 1.328 |
|  |  |  | Former v Never | 0.56333 | 0.10440 | 29.12 | <0.0001 | 1.757 |
|  |  |  | Pack-Years | 0.03538 | 0.00172 | 421.11 | <0.0001 | 1.036 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8768.15 | 7946.43 | PM2.5 | 0.26614 | 0.13121 | 4.11 | 0.0425 | 1.305 |
|  |  |  | Former v Never | 0.05511 | 0.13698 | 0.16 | 0.6875 | 1.057 |
|  |  |  | Pack-Years | 0.02635 | 0.00224 | 138.17 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.02936 | 0.00464 | 39.96 | <0.0001 | 1.030 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8768.15 | 7944.61 | PM2.5 | 0.26490 | 0.13117 | 4.08 | 0.0434 | 1.303 |
|  |  |  | Former v Never | 0.75062 | 0.37403 | 4.02 | 0.0448 | 2.118 |
|  |  |  | Pack-Years | 0.02658 | 0.00225 | 139.72 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.01703 | 0.00770 | 4.89 | 0.0269 | 1.017 |
|  |  |  | Months Quit | -0.00126 | 0.00063 | 3.94 | 0.0473 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8768.15 | 7942.09 | PM2.5 | 0.26608 | 0.13109 | 4.12 | 0.0424 | 1.305 |
|  |  |  | Former v Never | 0.48867 | 0.40329 | 1.47 | 0.2256 | 1.630 |
|  |  |  | Pack-Years | -0.73094 | 1.15803 | 0.39 | 0.5279 | 0.481 |
|  |  |  | Years Smoked | 0.02183 | 0.00812 | 7.23 | 0.0072 | 1.022 |
|  |  |  | Months Quit | -0.00084 | 0.00067 | 1.59 | 0.2072 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.03196 | 0.04892 | 0.43 | 0.5135 | 1.032 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00044 | 0.00068 | 0.41 | 0.5247 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.93e-6 | 3.19e-6 | 0.36 | 0.5453 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8768.15 | 7946.49 | PM2.5 | 0.26403 | 0.13121 | 4.05 | 0.0442 | 1.302 |
|  |  |  | Pack-Years | 0.02626 | 0.00224 | 137.70 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03070 | 0.00362 | 72.12 | <0.0001 | 1.031 |
|  |  |  | Months Quit | -0.00007 | 0.00023 | 0.10 | 0.7508 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8768.15 | 7938.19 | PM2.5 | 0.26546 | 0.13109 | 4.10 | 0.0429 | 1.304 |
|  |  |  | Pack-Years | 0.08382 | 0.01785 | 22.04 | <0.0001 | 1.087 |
|  |  |  | Years Smoked | 0.03056 | 0.00361 | 71.81 | <0.0001 | 1.031 |
|  |  |  | Months Quit | -0.00009 | 0.00023 | 0.15 | 0.6978 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00077 | 0.00024 | 10.45 | 0.0012 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8768.15 | 7939.77 | PM2.5 | 0.26535 | 0.13109 | 4.09 | 0.0429 | 1.304 |
|  |  |  | Pack-Years | -0.01711 | 0.15713 | 0.01 | 0.9133 | 0.983 |
|  |  |  | Years Smoked | 0.03068 | 0.00361 | 72.20 | <0.0001 | 1.031 |
|  |  |  | Months Quit | -0.00008 | 0.00023 | 0.13 | 0.7136 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.00202 | 0.00432 | 0.22 | 0.6400 | 1.002 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00002 | 0.00003 | 0.42 | 0.5176 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8768.15 | 7941.52 | PM2.5 | 0.26565 | 0.13110 | 4.10 | 0.0427 | 1.304 |
|  |  |  | Pack-Years | -0.58087 | 1.14325 | 0.26 | 0.6114 | 0.559 |
|  |  |  | Years Smoked | 0.03065 | 0.00361 | 72.05 | <0.0001 | 1.031 |
|  |  |  | Months Quit | -0.00008 | 0.00023 | 0.13 | 0.7159 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02603 | 0.04836 | 0.29 | 0.5904 | 1.026 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00036 | 0.00068 | 0.28 | 0.5984 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.58e-6 | 3.15e-6 | 0.25 | 0.6176 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8768.15 | 8006.86 | PM2.5 | 0.27594 | 0.13137 | 4.41 | 0.0357 | 1.318 |
|  |  |  | Pack-Years | -0.58570 | 1.07995 | 0.29 | 0.5876 | 0.557 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02783 | 0.04562 | 0.37 | 0.5419 | 1.028 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00039 | 0.00064 | 0.38 | 0.5351 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.82e-6 | 2.97e-6 | 0.38 | 0.5397 | 1.000 |

Based on Models 7C and 8, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown below in Figure S2.2.

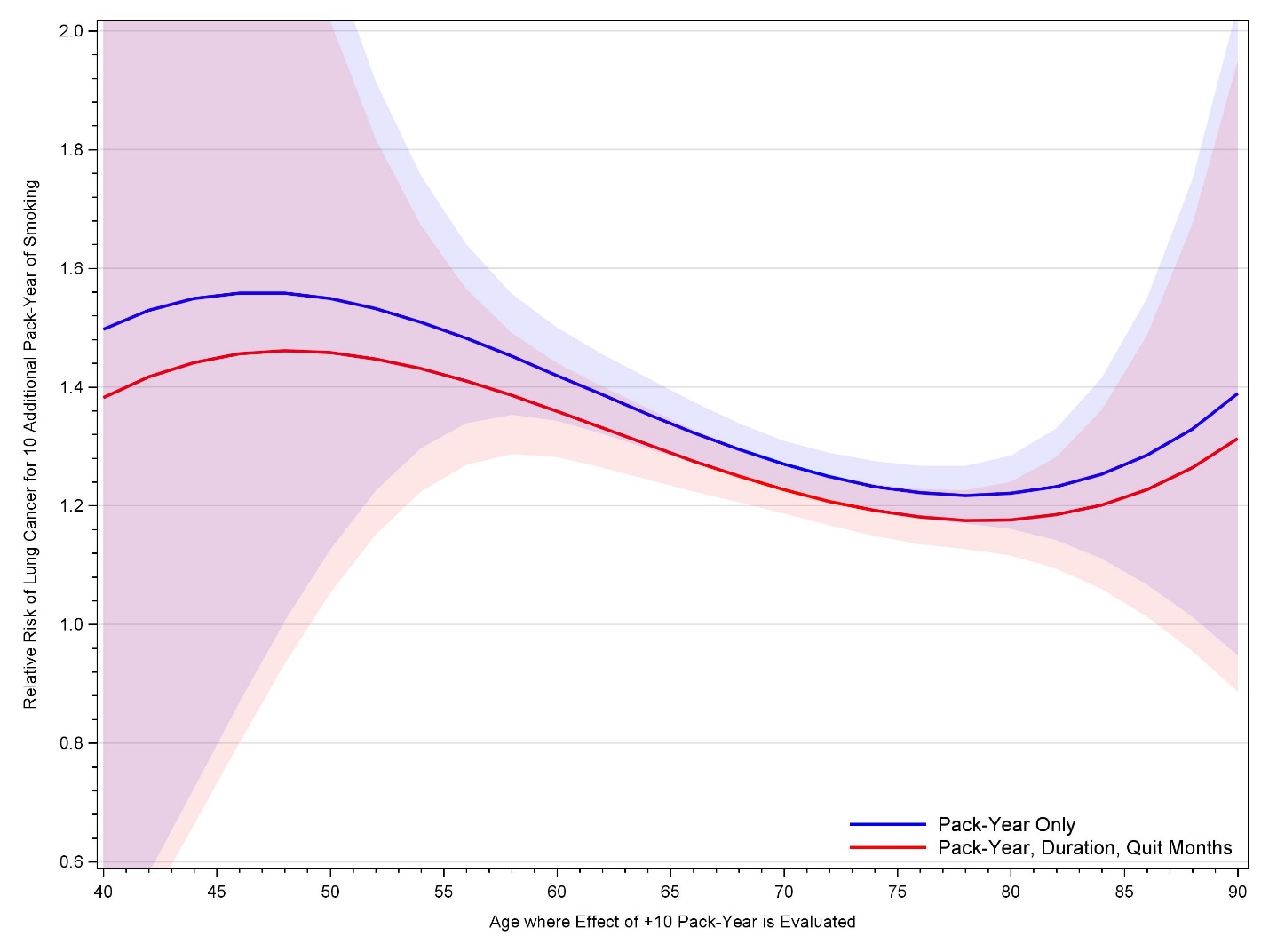


**Current or Former Smokers (Quit for < 10 Years)**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8445.84 | 8386.18 | PM2.5 | -0.10282 | 0.11150 | 0.85 | 0.3564 | 0.902 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8445.84 | 8355.80 | PM2.5 | -0.10368 | 0.11144 | 0.86 | 0.3522 | 0.902 |
|  |  |  | Current v Former | 0.35704 | 0.06336 | 31.75 | <0.0001 | 1.429 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8445.84 | 8040.23 | PM2.5 | -0.06768 | 0.11352 | 0.35 | 0.5511 | 0.935 |
|  |  |  | Current v Former | 0.11341 | 0.06537 | 3.01 | 0.0827 | 1.120 |
|  |  |  | Pack-Years | 0.02347 | 0.00130 | 328.27 | <0.0001 | 1.024 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8445.84 | 8017.92 | PM2.5 | -0.06801 | 0.11344 | 0.36 | 0.5488 | 0.934 |
|  |  |  | Current v Former | -0.02492 | 0.07140 | 0.12 | 0.7271 | 0.975 |
|  |  |  | Pack-Years | 0.02080 | 0.00141 | 218.41 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03074 | 0.00654 | 22.11 | <0.0001 | 1.031 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8445.84 | 8018.83 | PM2.5 | -0.06818 | 0.11347 | 0.36 | 0.5479 | 0.934 |
|  |  |  | Current v Former | 0.05183 | 0.10351 | 0.25 | 0.6166 | 1.053 |
|  |  |  | Pack-Years | 0.02076 | 0.00141 | 217.43 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03307 | 0.00699 | 22.38 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00158 | 0.00151 | 1.08 | 0.2975 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8445.84 | 8011.30 | PM2.5 | -0.07371 | 0.11327 | 0.31 | 0.5738 | 0.938 |
|  |  |  | Current v Former | 0.05020 | 0.10343 | 0.23 | 0.6274 | 1.051 |
|  |  |  | Pack-Years | -0.23106 | 0.88618 | 0.07 | 0.7943 | 0.794 |
|  |  |  | Years Smoked | 0.03170 | 0.00695 | 20.80 | <0.0001 | 1.032 |
|  |  |  | Months Quit | 0.00157 | 0.00151 | 1.08 | 0.2982 | 1.002 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01443 | 0.03873 | 0.14 | 0.7095 | 1.015 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00025 | 0.00056 | 0.19 | 0.6602 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.31e-6 | 2.69e-6 | 0.24 | 0.6263 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8445.84 | 8017.09 | PM2.5 | -0.06780 | 0.11346 | 0.36 | 0.5501 | 0.934 |
|  |  |  | Pack-Years | 0.02079 | 0.00141 | 218.38 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03322 | 0.00698 | 22.61 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00103 | 0.00105 | 0.96 | 0.3277 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8445.84 | 8007.01 | PM2.5 | -0.06363 | 0.11326 | 0.32 | 0.5742 | 0.938 |
|  |  |  | Pack-Years | 0.06931 | 0.01400 | 24.49 | <0.0001 | 1.072 |
|  |  |  | Years Smoked | 0.03220 | 0.00683 | 21.58 | <0.0001 | 1.033 |
|  |  |  | Months Quit | 0.00107 | 0.00105 | 1.04 | 0.3072 | 1.001 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00068 | 0.00019 | 12.10 | 0.0005 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8445.84 | 8007.76 | PM2.5 | -0.06342 | 0.11326 | 0.31 | 0.5755 | 0.939 |
|  |  |  | Pack-Years | 0.19727 | 0.11531 | 2.93 | 0.0871 | 1.218 |
|  |  |  | Years Smoked | 0.03186 | 0.00694 | 21.06 | <0.0001 | 1.032 |
|  |  |  | Months Quit | 0.00105 | 0.00105 | 1.00 | 0.3172 | 1.001 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00438 | 0.00331 | 1.75 | 0.1860 | 0.996 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00003 | 0.00002 | 1.25 | 0.2636 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8445.84 | 8009.53 | PM2.5 | -0.06344 | 0.11327 | 0.32 | 0.5754 | 0.939 |
|  |  |  | Pack-Years | -0.22435 | 0.88603 | 0.06 | 0.8001 | 0.799 |
|  |  |  | Years Smoked | 0.03184 | 0.00695 | 21.01 | <0.0001 | 1.032 |
|  |  |  | Months Quit | 0.00104 | 0.00105 | 0.98 | 0.3209 | 1.001 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01414 | 0.03873 | 0.13 | 0.7150 | 1.014 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00056 | 0.19 | 0.6655 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.29e-6 | 2.69e-6 | 0.23 | 0.6313 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8445.84 | 8031.38 | PM2.5 | -0.06177 | 0.11336 | 0.30 | 0.5858 | 0.940 |
|  |  |  | Pack-Years | -0.22146 | 0.86968 | 0.06 | 0.7990 | 0.801 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01460 | 0.03800 | 0.15 | 0.7009 | 1.015 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00025 | 0.00055 | 0.21 | 0.6430 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.38e-6 | 2.64e-6 | 0.27 | 0.6017 | 1.000 |

Based on Models 7C and 8, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown in Figure S2.3.

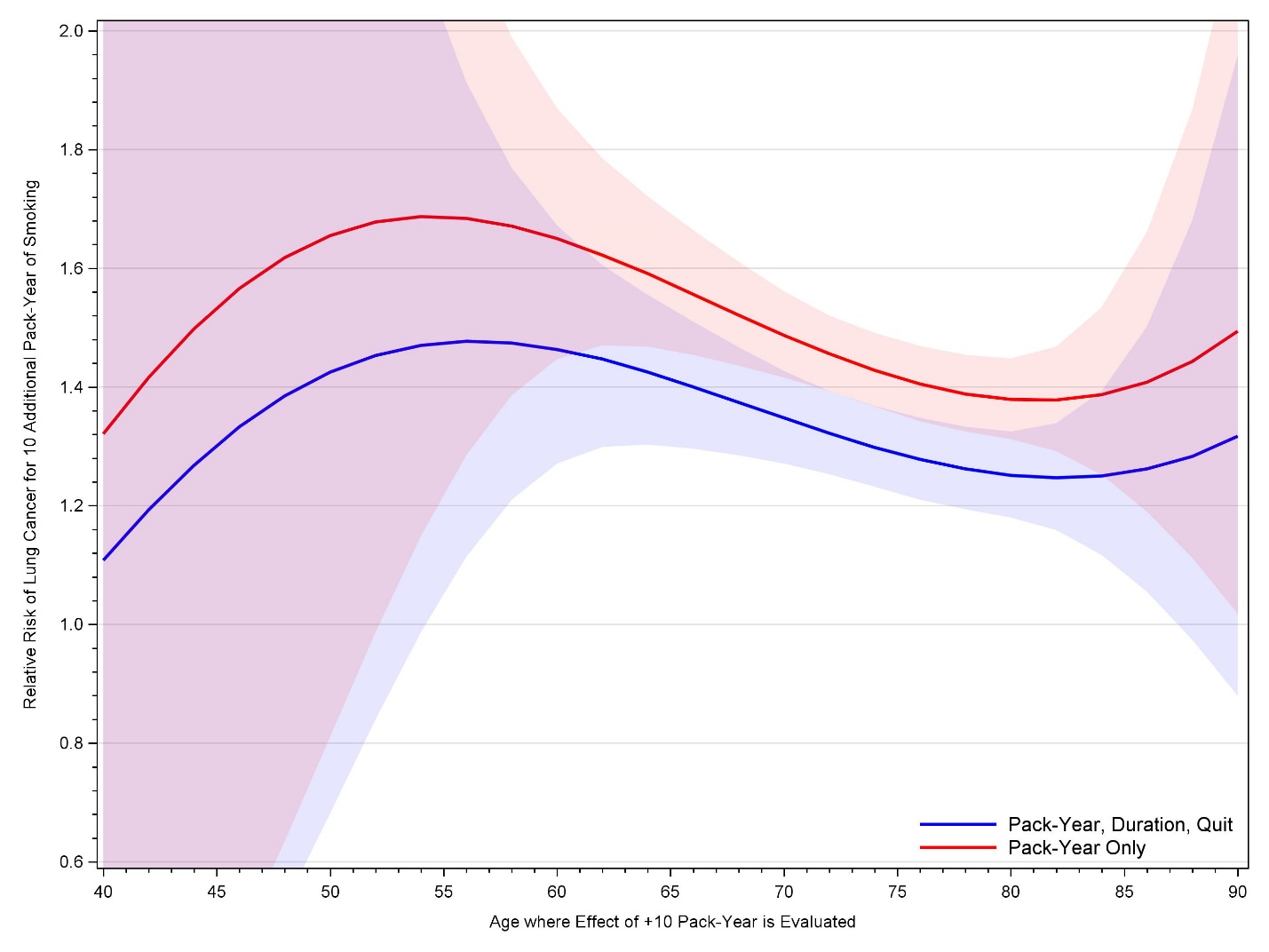


**Former Smokers Only (Quit for ≥ 10 Years)**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5837.27 | 5815.26 | PM2.5 | 0.26919 | 0.15074 | 3.19 | 0.0741 | 1.309 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5837.27 | 5462.76 | PM2.5 | 0.32317 | 0.15314 | 4.45 | 0.0348 | 1.382 |
|  |  |  | Pack-Years | 0.03590 | 0.00178 | 408.44 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5837.27 | 5422.81 | PM2.5 | 0.30013 | 0.15296 | 3.85 | 0.0497 | 1.350 |
|  |  |  | Pack-Years | 0.02670 | 0.00227 | 137.85 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03119 | 0.00482 | 41.84 | <0.0001 | 1.032 |
|  |  |  |  |  |  |  |  |  |
| 4. | 5837.27 | 5423.69 | PM2.5 | 0.29944 | 0.15295 | 3.83 | 0.0503 | 1.349 |
|  |  |  | Pack-Years | 0.02684 | 0.00228 | 138.66 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.02235 | 0.00949 | 5.55 | 0.0185 | 1.027 |
|  |  |  | Months Quit | -0.00083 | 0.00077 | 1.15 | 0.2832 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 5837.27 | 5419.70 | PM2.5 | 0.30011 | 0.15279 | 3.86 | 0.0495 | 1.350 |
|  |  |  | Pack-Years | 0.08206 | 0.02249 | 13.31 | 0.0003 | 1.086 |
|  |  |  | Years Smoked | 0.02107 | 0.00944 | 4.98 | 0.0256 | 1.021 |
|  |  |  | Months Quit | -0.00090 | 0.00077 | 1.38 | 0.2399 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00074 | 0.00030 | 6.06 | 0.0138 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 5837.27 | 5421.65 | PM2.5 | 0.30018 | 0.15279 | 3.86 | 0.0495 | 1.350 |
|  |  |  | Pack-Years | 0.12321 | 0.19926 | 0.38 | 0.5364 | 1.131 |
|  |  |  | Years Smoked | 0.02103 | 0.00944 | 4.96 | 0.0259 | 1.021 |
|  |  |  | Months Quit | -0.00090 | 0.00077 | 1.38 | 0.2401 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00188 | 0.00548 | 0.12 | 0.7321 | 0.998 |
|  |  |  | Pack-Yr-x-Age Squared | 7.80 e-6 | 0.00004 | 0.04 | 0.8354 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 5C. | 5837.27 | 5423.36 | PM2.5 | 0.30089 | 0.15286 | 3.87 | 0.0490 | 1.351 |
|  |  |  | Pack-Years | -0.63181 | 1.41139 | 0.20 | 0.6544 | 0.532 |
|  |  |  | Years Smoked | 0.02097 | 0.00944 | 4.94 | 0.0263 | 1.021 |
|  |  |  | Months Quit | -0.00091 | 0.00077 | 1.39 | 0.2386 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.03024 | 0.05965 | 0.26 | 0.6121 | 1.031 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00044 | 0.00083 | 0.28 | 0.5952 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 2.10e-6 | 3.89e-6 | 0.29 | 0.5882 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 5837.27 | 5461.25 | PM2.5 | 0.32476 | 0.15307 | 4.50 | 0.0355 | 1.384 |
|  |  |  | Pack-Years | -0.60916 | 1.36849 | 0.20 | 0.6562 | 0.544 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.03048 | 0.05780 | 0.28 | 0.5890 | 1.031 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00046 | 0.00081 | 0.32 | 0.5717 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 2.22e-6 | 3.76e-6 | 0.35 | 0.5563 | 1.000 |

Based on Models 5C and 6, HRs per 10 pack-years were evaluated at different ages. Effect modification by age is shown below in Figure S2.4.



**Section 2: Models using average packs**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,807.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21096.64 | PM2.5 | 0.06476 | 0.08400 | 0.59 | 0.4407 | 1.067 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19610.10 | PM2.5 | 0.06033 | 0.08404 | 0.51 | 0.4728 | 1.062 |
|  |  |  | Current v Never | 2.95759 | 0.08867 | 1112.57 | <0.0001 | 19.252 |
|  |  |  | Former v Never | 1.75807 | 0.08273 | 451.57 | <0.0001 | 5.801 |
|  |  |  |  |  |  |  |  |  |
| 3. | 21810.08 | 18859.40 | PM2.5 | 0.02126 | 0.08437 | 0.06 | 0.8010 | 1.021 |
|  |  |  | Current v Never | -0.34999 | 0.16193 | 4.67 | 0.0307 | 0.705 |
|  |  |  | Former v Never | -0.39287 | 0.13201 | 8.86 | 0.0029 | 0.675 |
|  |  |  | Average Packs | 1.01119 | 0.14172 | 50.91 | <0.0001 | 2.749 |
|  |  |  | Years Smoked | 0.06645 | 0.00259 | 657.31 | <0.0001 | 1.069 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18858.02 | PM2.5 | 0.02043 | 0.08435 | 0.06 | 0.8087 | 1.021 |
|  |  |  | Current v Never | 0.01185 | 0.25202 | 0.01 | 0.9625 | 1.012 |
|  |  |  | Former v Never | -0.00120 | 0.24787 | 0.01 | 0.9961 | 0.999 |
|  |  |  | Average Packs | 1.03797 | 0.14212 | 53.34 | <0.0001 | 2.823 |
|  |  |  | Years Smoked | 0.05921 | 0.00464 | 162.55 | <0.0001 | 1.061 |
|  |  |  | Months Quit | -0.00078 | 0.00042 | 3.45 | 0.0634 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18854.06 | PM2.5 | 0.02054 | 0.08435 | 0.06 | 0.8076 | 1.020 |
|  |  |  | Average Packs | 1.04356 | 0.13661 | 58.36 | <0.0001 | 2.850 |
|  |  |  | Years Smoked | 0.05933 | 0.00162 | 1333.17 | <0.0001 | 1.061 |
|  |  |  | Months Quit | -0.00080 | 0.00021 | 14.71 | 0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6A. | 21810.08 | 18855.84 | PM2.5 | 0.02065 | 0.08435 | 0.06 | 0.8066 | 1.021 |
|  |  |  | Average Packs | 0.55492 | 1.04591 | 0.28 | 0.5957 | 1.742 |
|  |  |  | Years Smoked | 0.05930 | 0.00163 | 1330.07 | <0.0001 | 1.061 |
|  |  |  | Months Quit | -0.00081 | 0.00021 | 14.92 | 0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00719 | 0.01519 | 0.22 | 0.6358 | 1.007 |
|  |  |  |  |  |  |  |  |  |
| 6B. | 21810.08 | 18856.40 | PM2.5 | 0.02128 | 0.08435 | 0.06 | 0.8008 | 1.022 |
|  |  |  | Average Packs | 3.47661 | 2.63948 | 1.73 | 0.1878 | 32.350 |
|  |  |  | Years Smoked | 0.05928 | 0.00163 | 1328.60 | <0.0001 | 1.061 |
|  |  |  | Months Quit | -0.00081 | 0.00021 | 15.02 | 0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.08287 | 0.07648 | 1.17 | 0.2786 | 0.920 |
|  |  |  | Ave Pck-x-Age Squared | 0.00068 | 0.00057 | 1.44 | 0.2293 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 6C. | 21810.08 | 18857.65 | PM2.5 | 0.02155 | 0.08435 | 0.06 | 0.7983 | 1.022 |
|  |  |  | Average Packs | 1.82597 | 3.41068 | 0.29 | 0.5924 | 6.209 |
|  |  |  | Years Smoked | 0.05928 | 0.00163 | 1328.31 | <0.0001 | 1.061 |
|  |  |  | Months Quit | -0.00081 | 0.00021 | 15.02 | 0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.10760 | 0.08203 | 1.72 | 0.1896 | 0.898 |
|  |  |  | Ave Pck-x-Age Squared | 0.00248 | 0.00220 | 1.27 | 0.2601 | 1.002 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.70 | 0.4027 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as covariate**

**Also include all the additional variables listed in previous section.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1687.59 | PM2.5 | 0.23889 | 0.26052 | 0.84 | 0.3592 | 1.270 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years)**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8658.05 | PM2.5 | 0.18348 | 0.12965 | 2.00 | 0.1570 | 1.201 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8349.63 | PM2.5 | 0.24140 | 0.12989 | 3.45 | 0.0631 | 1.273 |
|  |  |  | Former v Never | 1.41882 | 0.08850 | 257.03 | <0.0001 | 4.132 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8778.12 | 8078.50 | PM2.5 | 0.22346 | 0.13021 | 2.94 | 0.0861 | 1.250 |
|  |  |  | Former v Never | -0.29127 | 0.16650 | 3.06 | 0.0802 | 0.747 |
|  |  |  | Average Packs | 0.63719 | 0.19923 | 10.22 | 0.0014 | 1.891 |
|  |  |  | Years Smoked | 0.06333 | 0.00413 | 234.60 | <0.0001 | 1.065 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 8079.57 | PM2.5 | 0.22692 | 0.13017 | 3.04 | 0.0813 | 1.255 |
|  |  |  | Average Packs | 0.42504 | 0.17134 | 6.15 | 0.0131 | 1.530 |
|  |  |  | Years Smoked | 0.05756 | 0.00248 | 539.53 | <0.0001 | 1.059 |
|  |  |  |  |  |  |  |  |  |
| 5. | 8778.12 | 8078.09 | PM2.5 | 0.22171 | 0.13019 | 2.90 | 0.0886 | 1.248 |
|  |  |  | Former v Never | 0.24864 | 0.38048 | 0.43 | 0.5134 | 1.282 |
|  |  |  | Average Packs | 0.65054 | 0.19959 | 10.62 | 0.0011 | 1.917 |
|  |  |  | Years Smoked | 0.05397 | 0.00720 | 56.18 | <0.0001 | 1.055 |
|  |  |  | Months Quit | -0.00099 | 0.00063 | 2.46 | 0.1166 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 8076.51 | PM2.5 | 0.22185 | 0.13021 | 2.90 | 0.0884 | 1.248 |
|  |  |  | Average Packs | 0.67857 | 0.19308 | 12.35 | 0.0004 | 1.971 |
|  |  |  | Years Smoked | 0.05840 | 0.00247 | 559.68 | <0.0001 | 1.060 |
|  |  |  | Months Quit | -0.00062 | 0.00028 | 4.99 | 0.0255 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 8078.50 | PM2.5 | 0.22193 | 0.13021 | 2.90 | 0.0883 | 1.248 |
|  |  |  | Average Packs | 0.49447 | 1.38141 | 0.13 | 0.7204 | 1.640 |
|  |  |  | Years Smoked | 0.05840 | 0.00247 | 559.75 | <0.0001 | 1.060 |
|  |  |  | Months Quit | -0.00062 | 0.00028 | 4.97 | 0.0257 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00269 | 0.01992 | 0.02 | 0.8927 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 8078.46 | PM2.5 | 0.22105 | 0.13022 | 2.88 | 0.0896 | 1.247 |
|  |  |  | Average Packs | 6.09461 | 4.09884 | 2.21 | 0.1370 | 443.461 |
|  |  |  | Years Smoked | 0.05836 | 0.00247 | 558.71 | <0.0001 | 1.060 |
|  |  |  | Months Quit | -0.00063 | 0.00028 | 5.03 | 0.0249 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.16800 | 0.12014 | 1.95 | 0.1620 | 0.845 |
|  |  |  | Ave Pck-x-Age Squared | 0.00128 | 0.00089 | 2.07 | 0.1502 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 8079.84 | PM2.5 | 0.22132 | 0.13021 | 2.89 | 0.0892 | 1.248 |
|  |  |  | Average Packs | 4.96490 | 4.57287 | 1.18 | 0.2776 | 143.295 |
|  |  |  | Years Smoked | 0.05835 | 0.00247 | 558.09 | <0.0001 | 1.060 |
|  |  |  | Months Quit | -0.00063 | 0.00028 | 5.08 | 0.0241 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.21830 | 0.13715 | 2.53 | 0.1115 | 0.804 |
|  |  |  | Ave Pck-x-Age Squared | 0.00349 | 0.00300 | 1.35 | 0.2446 | 1.003 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.58 | 0.4457 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Current or Former Smokers (Quit for < 10 Years)**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8395.23 | PM2.5 | -0.10357 | 0.11144 | 0.86 | 0.3527 | 0.902 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8364.52 | PM2.5 | -0.10463 | 0.11138 | 0.88 | 0.3475 | 0.901 |
|  |  |  | Current v Former | 0.35871 | 0.06334 | 32.07 | <0.0001 | 1.431 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8145.34 | PM2.5 | -0.08601 | 0.11210 | 0.59 | 0.4429 | 0.918 |
|  |  |  | Current v Former | -0.09017 | 0.07153 | 1.59 | 0.2075 | 0.914 |
|  |  |  | Average Packs | 3.60876 | 0.28547 | 159.80 | <0.0001 | 36.92 |
|  |  |  | Years Smoked | 0.08017 | 0.00656 | 149.43 | <0.0001 | 1.083 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8144.92 | PM2.5 | -0.08698 | 0.11206 | 0.60 | 0.4377 | 0.917 |
|  |  |  | Average Packs | 3.50201 | 0.27122 | 166.72 | <0.0001 | 33.182 |
|  |  |  | Years Smoked | 0.07642 | 0.00578 | 175.02 | <0.0001 | 1.079 |
|  |  |  |  |  |  |  |  |  |
| 5. | 8454.28 | 8142.34 | PM2.5 | -0.08534 | 0.11218 | 0.58 | 0.4468 | 0.918 |
|  |  |  | Current v Former | 0.06987 | 0.10316 | 0.46 | 0.4982 | 1.072 |
|  |  |  | Average Packs | 3.74052 | 0.29455 | 161.27 | <0.0001 | 42.120 |
|  |  |  | Years Smoked | 0.08581 | 0.00718 | 142.71 | <0.0001 | 1.090 |
|  |  |  | Months Quit | 0.00341 | 0.00153 | 5.00 | 0.0253 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8140.80 | PM2.5 | -0.08512 | 0.11218 | 0.57 | 0.4480 | 0.918 |
|  |  |  | Average Packs | 3.75462 | 0.29388 | 163.23 | <0.0001 | 42.718 |
|  |  |  | Years Smoked | 0.08610 | 0.00717 | 144.14 | <0.0001 | 1.090 |
|  |  |  | Months Quit | 0.00268 | 0.00108 | 6.18 | 0.0129 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8142.65 | PM2.5 | -0.08613 | 0.11223 | 0.59 | 0.4428 | 0.917 |
|  |  |  | Average Packs | 2.74909 | 2.57086 | 1.14 | 0.2849 | 15.628 |
|  |  |  | Years Smoked | 0.08633 | 0.00720 | 143.74 | <0.0001 | 1.090 |
|  |  |  | Months Quit | 0.00270 | 0.00108 | 6.27 | 0.0123 | 1.003 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01489 | 0.03775 | 0.15 | 0.6932 | 1.015 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8144.04 | PM2.5 | -0.08563 | 0.11223 | 0.58 | 0.4455 | 0.918 |
|  |  |  | Average Packs | 4.89535 | 3.77013 | 1.68 | 0.1941 | 133.667 |
|  |  |  | Years Smoked | 0.08651 | 0.00721 | 143.92 | <0.0001 | 1.090 |
|  |  |  | Months Quit | 0.00273 | 0.00108 | 6.41 | 0.0114 | 1.003 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.05967 | 0.10284 | 0.34 | 0.5617 | 0.942 |
|  |  |  | Ave Pck-x-Age Squared | 0.00063 | 0.00080 | 0.61 | 0.4354 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8144.98 | PM2.5 | -0.08401 | 0.11228 | 0.56 | 0.4543 | 0.919 |
|  |  |  | Average Packs | 13.82772 | 9.33956 | 2.19 | 0.1387 | >999 |
|  |  |  | Years Smoked | 0.08652 | 0.00720 | 144.51 | <0.0001 | 1.090 |
|  |  |  | Months Quit | 0.00271 | 0.00108 | 6.31 | 0.0120 | 1.003 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.04704 | 0.10357 | 0.21 | 0.6497 | 0.954 |
|  |  |  | Ave Pck-x-Age Squared | -0.00564 | 0.00607 | 0.86 | 0.3525 | 0.994 |
|  |  |  | Ave Pck-x-Age Cubed | 0.00006 | 0.00006 | 1.09 | 0.2968 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Former Smokers Only (Quit for ≥ 10 Years)**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region and additional variables as covariates.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5824.32 | PM2.5 | 0.27182 | 0.15062 | 3.26 | 0.0711 | 1.312 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5555.65 | PM2.5 | 0.24348 | 0.15124 | 2.59 | 0.1074 | 1.276 |
|  |  |  | Average Packs | 0.63371 | 0.20194 | 9.85 | 0.0017 | 1.885 |
|  |  |  | Years Smoked | 0.06552 | 0.00433 | 228.89 | <0.0001 | 1.068 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5557.31 | PM2.5 | 0.24043 | 0.15134 | 2.52 | 0.1122 | 1.272 |
|  |  |  | Average Packs | 0.65209 | 0.20166 | 10.46 | 0.0012 | 1.920 |
|  |  |  | Years Smoked | 0.06073 | 0.00905 | 45.02 | <0.0001 | 1.063 |
|  |  |  | Months Quit | -0.00049 | 0.00078 | 0.41 | 0.5235 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 4A. | 5845.55 | 5558.84 | PM2.5 | 0.24337 | 0.15127 | 2.59 | 0.1077 | 1.276 |
|  |  |  | Average Packs | -0.41508 | 1.58413 | 0.07 | 0.7933 | 0.660 |
|  |  |  | Years Smoked | 0.06117 | 0.00906 | 45.56 | <0.0001 | 1.063 |
|  |  |  | Months Quit | -0.00046 | 0.00078 | 0.35 | 0.5532 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01524 | 0.02249 | 0.46 | 0.4979 | 1.015 |
|  |  |  |  |  |  |  |  |  |
| 4B. | 5845.55 | 5557.85 | PM2.5 | 0.24132 | 0.15129 | 2.54 | 0.1107 | 1.273 |
|  |  |  | Average Packs | 6.49945 | 4.23089 | 2.26 | 0.1245 | 664.779 |
|  |  |  | Years Smoked | 0.06119 | 0.00906 | 45.63 | <0.0001 | 1.063 |
|  |  |  | Months Quit | -0.00045 | 0.00078 | 0.34 | 0.5608 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.19541 | 0.12278 | 2.53 | 0.1115 | 0.822 |
|  |  |  | Ave Pck-x-Age Squared | 0.00158 | 0.00090 | 3.04 | 0.0814 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 4C. | 5837.27 | 5550.25 | PM2.5 | 0.24132 | 0.15137 | 2.54 | 0.1109 | 1.273 |
|  |  |  | Average Packs | 0.71556 | 0.20607 | 12.06 | 0.0005 | 2.045 |
|  |  |  | Years Smoked | -0.60696 | 2.27657 | 0.07 | 0.7898 | 0.545 |
|  |  |  | Months Quit | -0.00052 | 0.00077 | 0.45 | 0.4501 | 0.999 |
|  |  |  | Yrs Smk-x-Age (Yrs) | 0.03012 | 0.09731 | 0.09 | 0.7569 | 1.031 |
|  |  |  | Yrs Smk-x-Age Squared | -0.00043 | 0.00138 | 0.10 | 0.7539 | 1.000 |
|  |  |  | Yrs Smk-x-Age Cubed | 1.99 e-6 | 6.48e-6 | 0.09 | 0.7588 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**APPENDIX 3: Secondary analyses**

**Section 1: Models using pack-years and different PM2.5 averaging times (without additional variables)**

**Full Cohort (Current, Never, and Former Smokers)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 21788.31 | 21774.47 | PM2.5 | 0.02388 | 0.08291 | 0.08 | 0.7734 | 1.024 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18494.88 | PM2.5 | 0.04859 | 0.08406 | 0.33 | 0.5632 | 1.050 |
|  |  |  |  | Pack-Years | -0.30229 | 0.47802 | 0.40 | 0.5271 | 0.739 |
|  |  |  |  | Years Smoked | 0.03847 | 0.00208 | 343.45 | <0.0001 | 1.039 |
|  |  |  |  | Months Quit | -0.00006 | 0.00018 | 0.10 | 0.7475 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01582 | 0.02074 | 0.58 | 0.4456 | 1.016 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00030 | 0.65 | 0.4209 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.15e-6 | 1.42e-6 | 0.66 | 0.4182 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 21788.31 | 21774.52 | PM2.5 | 0.01431 | 0.08357 | 0.03 | 0.8641 | 1.014 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18494.99 | PM2.5 | 0.03976 | 0.08470 | 0.22 | 0.6388 | 1.041 |
|  |  |  |  | Pack-Years | -0.30161 | 0.47802 | 0.40 | 0.5281 | 0.740 |
|  |  |  |  | Years Smoked | 0.03847 | 0.00208 | 343.53 | <0.0001 | 1.039 |
|  |  |  |  | Months Quit | -0.00006 | 0.00018 | 0.11 | 0.7451 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01579 | 0.02074 | 0.58 | 0.4465 | 1.016 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00030 | 0.64 | 0.4217 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.15e-6 | 1.42e-6 | 0.65 | 0.4190 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 21788.31 | 21774.55 | PM2.5 | 0.00278 | 0.08376 | 0.00 | 0.9736 | 1.003 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18495.13 | PM2.5 | 0.02445 | 0.08491 | 0.08 | 0.7734 | 1.025 |
|  |  |  |  | Pack-Years | -0.30092 | 0.47802 | 0.40 | 0.5290 | 0.740 |
|  |  |  |  | Years Smoked | 0.03848 | 0.00208 | 343.61 | <0.0001 | 1.039 |
|  |  |  |  | Months Quit | -0.00006 | 0.00018 | 0.11 | 0.7406 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01576 | 0.02074 | 0.58 | 0.4474 | 1.016 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00030 | 0.64 | 0.4226 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.14e-6 | 1.42e-6 | 0.65 | 0.4200 | 1.000 |

**Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 1667.02 | 1667.72 | PM2.5 | 0.21280 | 0.25937 | 0.67 | 0.4120 | 1.237 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 1667.02 | 1667.87 | PM2.5 | 0.18868 | 0.26103 | 0.52 | 0.4698 | 1.208 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 1667.02 | 1667.84 | PM2.5 | 0.18720 | 0.26112 | 0.51 | 0.4734 | 1.206 |

**Never or Former Smokers (Quit for ≥ 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8768.14 | 8768.32 | PM2.5 | 0.13509 | 0.12794 | 1.11 | 0.2910 | 1.145 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 7927.64 | PM2.5 | 0.25684 | 0.12973 | 3.92 | 0.0477 | 1.293 |
|  |  |  |  | Pack-Years | -0.48231 | 1.13605 | 0.18 | 0.6712 | 0.617 |
|  |  |  |  | Years Smoked | 0.03228 | 0.00352 | 84.08 | <0.0001 | 1.033 |
|  |  |  |  | Months Quit | -0.00004 | 0.00022 | 0.04 | 0.8484 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02220 | 0.04808 | 0.21 | 0.6443 | 1.022 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00067 | 0.21 | 0.6481 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.37 e-6 | 3.14 e-6 | 0.19 | 0.6638 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8768.14 | 8768.60 | PM2.5 | 0.11789 | 0.12878 | 0.84 | 0.3600 | 1.125 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 7927.99 | PM2.5 | 0.24652 | 0.13057 | 3.56 | 0.0590 | 1.280 |
|  |  |  |  | Pack-Years | -0.47814 | 1.13582 | 0.18 | 0.6738 | 0.620 |
|  |  |  |  | Years Smoked | 0.03230 | 0.00352 | 84.13 | <0.0001 | 1.033 |
|  |  |  |  | Months Quit | -0.00004 | 0.00022 | 0.04 | 0.8464 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02201 | 0.04807 | 0.21 | 0.6470 | 1.022 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00067 | 0.20 | 0.6509 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.37 e-6 | 3.14 e-6 | 0.18 | 0.6667 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8768.14 | 8768.88 | PM2.5 | 0.09614 | 0.12918 | 0.55 | 0.4567 | 1.101 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 7928.58 | PM2.5 | 0.22597 | 0.13098 | 2.98 | 0.0845 | 1.254 |
|  |  |  |  | Pack-Years | -0.47212 | 1.13544 | 0.17 | 0.6776 | 0.624 |
|  |  |  |  | Years Smoked | 0.03230 | 0.00352 | 84.17 | <0.0001 | 1.033 |
|  |  |  |  | Months Quit | -0.00004 | 0.00023 | 0.04 | 0.8427 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02176 | 0.04806 | 0.21 | 0.6507 | 1.022 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00030 | 0.00067 | 0.20 | 0.6546 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.34 e-6 | 3.14 e-6 | 0.18 | 0.6705 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8445.84 | 8441.06 | PM2.5 | -0.11217 | 0.11027 | 1.03 | 0.3091 | 0.894 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8009.18 | PM2.5 | -0.07826 | 0.11174 | 0.49 | 0.4837 | 0.925 |
|  |  |  |  | Pack-Years | -0.29630 | 0.88495 | 0.11 | 0.7378 | 0.744 |
|  |  |  |  | Years Smoked | 0.03372 | 0.00691 | 23.84 | <0.0001 | 1.034 |
|  |  |  |  | Months Quit | 0.00020 | 0.00103 | 0.04 | 0.8489 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01743 | 0.03870 | 0.20 | 0.6525 | 1.018 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00056 | 0.27 | 0.6031 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.53e-6 | 2.69e-6 | 0.32 | 0.5695 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8445.84 | 8440.98 | PM2.5 | -0.11752 | 0.11133 | 1.11 | 0.2912 | 0.889 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8009.09 | PM2.5 | -0.08575 | 0.11273 | 0.58 | 0.4468 | 0.918 |
|  |  |  |  | Pack-Years | -0.29656 | 0.88494 | 0.11 | 0.7375 | 0.743 |
|  |  |  |  | Years Smoked | 0.03372 | 0.00691 | 23.84 | <0.0001 | 1.034 |
|  |  |  |  | Months Quit | 0.00020 | 0.00103 | 0.04 | 0.8489 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01744 | 0.03870 | 0.20 | 0.6523 | 1.018 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00056 | 0.27 | 0.6029 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.53 e-6 | 2.69 e-6 | 0.32 | 0.5693 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8445.84 | 8440.94 | PM2.5 | -0.11992 | 0.11166 | 1.15 | 0.2828 | 0.887 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8008.95 | PM2.5 | -0.09584 | 0.11314 | 0.72 | 0.3969 | 0.909 |
|  |  |  |  | Pack-Years | -0.29587 | 0.88499 | 0.11 | 0.7381 | 0.744 |
|  |  |  |  | Years Smoked | 0.03373 | 0.00691 | 23.85 | <0.0001 | 1.034 |
|  |  |  |  | Months Quit | 0.00020 | 0.00103 | 0.04 | 0.8482 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01741 | 0.03870 | 0.20 | 0.6528 | 1.018 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00056 | 0.27 | 0.6034 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.53e-6 | 2.69e-6 | 0.32 | 0.5698 | 1.000 |

**Former Smokers Only**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 5837.27 | 5839.81 | PM2.5 | 0.26740 | 0.14844 | 3.24 | 0.0716 | 1.307 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5400.66 | PM2.5 | 0.29592 | 0.15071 | 3.85 | 0.0496 | 1.344 |
|  |  |  |  | Pack-Years | -0.55049 | 1.40727 | 0.15 | 0.6957 | 0.577 |
|  |  |  |  | Years Smoked | 0.02339 | 0.00942 | 6.16 | 0.0131 | 1.024 |
|  |  |  |  | Months Quit | -0.00080 | 0.00077 | 1.08 | 0.2988 | 0.999 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02712 | 0.05948 | 0.21 | 0.6485 | 1.027 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00040 | 0.00083 | 0.24 | 0.6270 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.95e-6 | 3.88e-6 | 0.25 | 0.6154 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 5837.27 | 5840.16 | PM2.5 | 0.25388 | 0.14930 | 2.89 | 0.0890 | 1.289 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5400.94 | PM2.5 | 0.28694 | 0.15165 | 3.58 | 0.0585 | 1.332 |
|  |  |  |  | Pack-Years | -0.54507 | 1.40686 | 0.15 | 0.6984 | 0.580 |
|  |  |  |  | Years Smoked | 0.02342 | 0.00942 | 6.16 | 0.0129 | 1.024 |
|  |  |  |  | Months Quit | -0.00080 | 0.00077 | 1.08 | 0.2994 | 0.999 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02688 | 0.05947 | 0.20 | 0.6512 | 1.027 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00040 | 0.00083 | 0.23 | 0.6297 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.93e-6 | 3.88e-6 | 0.25 | 0.6182 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 5837.27 | 5840.91 | PM2.5 | 0.21944 | 0.14999 | 2.14 | 0.1435 | 1.245 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5401.77 | PM2.5 | 0.25257 | 0.15242 | 2.74 | 0.0975 | 1.287 |
|  |  |  |  | Pack-Years | -0.53525 | 1.40660 | 0.14 | 0.7036 | 0.586 |
|  |  |  |  | Years Smoked | 0.02344 | 0.00942 | 6.19 | 0.0129 | 1.024 |
|  |  |  |  | Months Quit | -0.00080 | 0.00077 | 1.08 | 0.2991 | 0.999 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02646 | 0.05946 | 0.20 | 0.6563 | 1.027 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00040 | 0.00083 | 0.23 | 0.6347 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.90e-6 | 3.88e-6 | 0.24 | 0.6232 | 1.000 |

**Current or Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8760.95 | 8745.27 | PM2.5 | -0.13378 | 0.12222 | 1.20 | 0.2737 | 0.875 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6629.05 | PM2.5 | -0.11597 | 0.12529 | 0.86 | 0.3546 | 0.890 |
|  |  |  |  | Pack-Years | -0.40929 | 0.64674 | 0.40 | 0.5268 | 0.664 |
|  |  |  |  | Years Smoked | 0.04262 | 0.00274 | 241.98 | <0.0001 | 1.044 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02069 | 0.02825 | 0.54 | 0.4638 | 1.021 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00041 | 0.59 | 0.4421 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.51e-6 | 1.96e-6 | 0.60 | 0.4388 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8760.95 | 8745.00 | PM2.5 | -0.14971 | 0.12341 | 1.47 | 0.2251 | 0.861 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6628.78 | PM2.5 | -0.13407 | 0.12633 | 1.13 | 0.2886 | 0.875 |
|  |  |  |  | Pack-Years | -0.40851 | 0.64677 | 0.40 | 0.5276 | 0.665 |
|  |  |  |  | Years Smoked | 0.04262 | 0.00274 | 241.98 | <0.0001 | 1.044 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02066 | 0.02825 | 0.53 | 0.4646 | 1.021 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00041 | 0.59 | 0.4429 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.51e-6 | 1.96e-6 | 0.60 | 0.4395 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8760.95 | 8745.19 | PM2.5 | -0.13983 | 0.12360 | 1.28 | 0.2579 | 0.870 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6628.99 | PM2.5 | -0.12161 | 0.12664 | 0.92 | 0.3369 | 0.885 |
|  |  |  |  | Pack-Years | -0.40748 | 0.64677 | 0.40 | 0.5287 | 0.665 |
|  |  |  |  | Years Smoked | 0.04262 | 0.00274 | 241.90 | <0.0001 | 1.044 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02062 | 0.02825 | 0.53 | 0.4655 | 1.021 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00041 | 0.59 | 0.4437 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.51e-6 | 1.96e-6 | 0.60 | 0.4403 | 1.000 |

**Models Using Average Packs (Total Pack-Years / Years Smoked, without additional variables)**

**Full Cohort (Current, Never, and Former Smokers)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 21788.31 | 21774.47 | PM2.5 | 0.02388 | 0.08291 | 0.08 | 0.7734 | 1.024 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18810.86 | PM2.5 | 0.01691 | 0.08349 | 0.04 | 0.8395 | 1.017 |
|  |  |  |  | Average Packs | 1.11424 | 0.13596 | 67.16 | <0.0001 | 3.047 |
|  |  |  |  | Years Smoked | -0.63799 | 0.77831 | 0.67 | 0.4124 | 0.528 |
|  |  |  |  | Months Quit | -0.00082 | 0.00020 | 16.67 | <0.0001 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03193 | 0.03363 | 0.90 | 0.3424 | 1.032 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00046 | 0.00048 | 0.91 | 0.3389 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.11e-6 | 2.28e-6 | 0.86 | 0.3544 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 21788.31 | 21774.52 | PM2.5 | 0.01431 | 0.08357 | 0.03 | 0.8641 | 1.014 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18810.88 | PM2.5 | 0.01691 | 0.08349 | 0.04 | 0.8395 | 1.017 |
|  |  |  |  | Average Packs | 1.11424 | 0.13596 | 67.16 | <0.0001 | 3.047 |
|  |  |  |  | Years Smoked | -0.63799 | 0.77831 | 0.67 | 0.4124 | 0.528 |
|  |  |  |  | Months Quit | -0.00082 | 0.00020 | 16.67 | <0.0001 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03193 | 0.03363 | 0.90 | 0.3424 | 1.032 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00046 | 0.00048 | 0.91 | 0.3389 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.11e-6 | 2.28e-6 | 0.86 | 0.3544 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 21788.31 | 21774.55 | PM2.5 | 0.00278 | 0.08376 | 0.01 | 0.9736 | 1.003 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18810.90 | PM2.5 | -0.00180 | 0.08440 | 0.00 | 0.8829 | 0.998 |
|  |  |  |  | Average Packs | 1.11421 | 0.13597 | 67.15 | <0.0001 | 3.047 |
|  |  |  |  | Years Smoked | -0.63661 | 0.77833 | 0.67 | 0.4134 | 0.529 |
|  |  |  |  | Months Quit | -0.00083 | 0.00020 | 16.72 | <0.0001 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03187 | 0.03363 | 0.90 | 0.3434 | 1.032 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00046 | 0.00048 | 0.91 | 0.3399 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.11e-6 | 2.28e-6 | 0.86 | 0.3554 | 1.000 |

**Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 1667.02 | 1667.72 | PM2.5 | 0.21280 | 0.25937 | 0.67 | 0.4120 | 1.237 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 1667.02 | 1667.87 | PM2.5 | 0.18868 | 0.26103 | 0.52 | 0.4698 | 1.208 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 1667.02 | 1667.88 | PM2.5 | 0.18720 | 0.26112 | 0.51 | 0.4734 | 1.206 |

**Never or Former Smokers (Quit for ≥ 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8768.14 | 8768.32 | PM2.5 | 0.13509 | 0.12794 | 1.11 | 0.2910 | 1.145 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 8052.16 | PM2.5 | 0.21588 | 0.12893 | 2.80 | 0.0941 | 1.241 |
|  |  |  |  | Average Packs | 0.69476 | 0.19302 | 12.96 | 0.0003 | 2.003 |
|  |  |  |  | Years Smoked | -0.48281 | 1.54922 | 0.10 | 0.7553 | 0.617 |
|  |  |  |  | Months Quit | -0.00062 | 0.00027 | 5.24 | 0.0221 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02200 | 0.06574 | 0.11 | 0.7379 | 1.022 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00028 | 0.00092 | 0.09 | 0.7622 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.11e-6 | 4.31e-6 | 0.07 | 0.7969 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8768.14 | 8768.60 | PM2.5 | 0.11789 | 0.12878 | 0.84 | 0.3600 | 1.125 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 8052.44 | PM2.5 | 0.20598 | 0.12979 | 2.52 | 0.0941 | 1.241 |
|  |  |  |  | Average Packs | 0.69465 | 0.19302 | 12.95 | 0.0003 | 2.003 |
|  |  |  |  | Years Smoked | -0.48160 | 1.54914 | 0.10 | 0.7559 | 0.618 |
|  |  |  |  | Months Quit | -0.00062 | 0.00027 | 5.24 | 0.0220 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02194 | 0.06573 | 0.11 | 0.7385 | 1.022 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00028 | 0.00092 | 0.09 | 0.7629 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.11e-6 | 4.31e-6 | 0.07 | 0.7976 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8768.14 | 8768.88 | PM2.5 | 0.09614 | 0.12918 | 0.55 | 0.4567 | 1.101 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 8052.92 | PM2.5 | 0.18591 | 0.13014 | 2.04 | 0.1531 | 1.204 |
|  |  |  |  | Average Packs | 0.69436 | 0.19304 | 12.94 | 0.0003 | 2.002 |
|  |  |  |  | Years Smoked | -0.48037 | 1.54895 | 0.10 | 0.7565 | 0.619 |
|  |  |  |  | Months Quit | -0.00062 | 0.00027 | 5.26 | 0.0218 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02189 | 0.06573 | 0.11 | 0.7391 | 1.022 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00028 | 0.00092 | 0.09 | 0.7635 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.10e-6 | 4.31e-6 | 0.07 | 0.7983 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8445.84 | 8441.06 | PM2.5 | -0.11217 | 0.11027 | 1.03 | 0.3091 | 0.894 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8142.70 | PM2.5 | -0.10180 | 0.11088 | 0.84 | 0.3585 | 0.903 |
|  |  |  |  | Average Packs | 3.83232 | 0.29498 | 168.79 | <0.0001 | 46.170 |
|  |  |  |  | Years Smoked | 0.67717 | 3.10358 | 0.05 | 0.8273 | 1.968 |
|  |  |  |  | Months Quit | 0.00202 | 0.00106 | 3.62 | 0.0570 | 1.002 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | -0.02385 | 0.13539 | 0.03 | 0.8601 | 0.976 |
|  |  |  |  | Yrs Smk-x-Age Squared | 0.00034 | 0.00196 | 0.03 | 0.8617 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | -1.71e-6 | 9.37e-6 | 0.03 | 0.8554 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8445.84 | 8440.98 | PM2.5 | -0.11752 | 0.11133 | 1.11 | 0.2912 | 0.889 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8142.60 | PM2.5 | -0.10871 | 0.11191 | 0.94 | 0.3314 | 0.897 |
|  |  |  |  | Average Packs | 3.83268 | 0.29497 | 168.839 | <0.0001 | 46.186 |
|  |  |  |  | Years Smoked | 0.67463 | 3.10374 | 0.05 | 0.8279 | 1.963 |
|  |  |  |  | Months Quit | 0.00202 | 0.00106 | 3.62 | 0.0571 | 1.002 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | -0.02374 | 0.13540 | 0.03 | 0.8608 | 0.977 |
|  |  |  |  | Yrs Smk-x-Age Squared | 0.00034 | 0.00196 | 0.03 | 0.8624 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | -1.70e-6 | 9.37e-6 | 0.03 | 0.8561 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8445.84 | 8440.94 | PM2.5 | -0.11992 | 0.11166 | 1.15 | 0.2828 | 0.887 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8142.51 | PM2.5 | -0.11421 | 0.11231 | 1.03 | 0.3092 | 0.892 |
|  |  |  |  | Average Packs | 3.83278 | 0.29495 | 168.86 | <0.0001 | 46.191 |
|  |  |  |  | Years Smoked | 0.67815 | 3.10393 | 0.05 | 0.8271 | 1.970 |
|  |  |  |  | Months Quit | 0.00202 | 0.00106 | 3.62 | 0.0569 | 1.002 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | -0.02388 | 0.13540 | 0.03 | 0.8600 | 0.976 |
|  |  |  |  | Yrs Smk-x-Age Squared | 0.00034 | 0.00196 | 0.03 | 0.8617 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | -1.71e-6 | 9.37e-6 | 0.03 | 0.8555 | 1.000 |

**Former Smokers Only**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 5837.27 | 5839.81 | PM2.5 | 0.26740 | 0.14844 | 3.24 | 0.0716 | 1.307 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5526.70 | PM2.5 | 0.24044 | 0.14936 | 2.59 | 0.1074 | 1.272 |
|  |  |  |  | Average Packs | 0.69480 | 0.20408 | 11.59 | 0.0007 | 2.003 |
|  |  |  |  | Years Smoked | -0.55369 | 2.26487 | 0.06 | 0.8069 | 0.575 |
|  |  |  |  | Months Quit | -0.00043 | 0.00077 | 0.31 | 0.5789 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02880 | 0.09681 | 0.09 | 0.7661 | 1.029 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00042 | 0.00137 | 0.09 | 0.7568 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.00 e-6 | 6.45 e-6 | 0.10 | 0.7559 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 5837.27 | 5840.16 | PM2.5 | 0.25388 | 0.14930 | 2.89 | 0.0890 | 1.289 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5526.90 | PM2.5 | 0.23251 | 0.15032 | 2.39 | 0.1219 | 1.262 |
|  |  |  |  | Average Packs | 0.69474 | 0.20405 | 11.59 | 0.0007 | 2.003 |
|  |  |  |  | Years Smoked | -0.55553 | 2.26461 | 0.06 | 0.8062 | 0.574 |
|  |  |  |  | Months Quit | -0.00043 | 0.00077 | 0.31 | 0.5792 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02888 | 0.09680 | 0.09 | 0.7654 | 1.029 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00043 | 0.00137 | 0.09 | 0.7562 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.00 e-6 | 6.45 e-6 | 0.10 | 0.7554 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 5837.27 | 5840.91 | PM2.5 | 0.21944 | 0.14999 | 2.14 | 0.1435 | 1.245 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5527.55 | PM2.5 | 0.19880 | 0.15096 | 1.73 | 0.1879 | 1.220 |
|  |  |  |  | Average Packs | 0.69465 | 0.20403 | 11.59 | 0.0007 | 2.003 |
|  |  |  |  | Years Smoked | -0.55770 | 2.26511 | 0.06 | 0.8055 | 0.575 |
|  |  |  |  | Months Quit | -0.00043 | 0.00077 | 0.31 | 0.5782 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02896 | 0.09682 | 0.09 | 0.7649 | 1.029 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00043 | 0.00137 | 0.10 | 0.7557 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.01 e-6 | 6.45 e-6 | 0.10 | 0.7549 | 1.000 |

**Current or Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8760.95 | 8745.27 | PM2.5 | -0.13378 | 0.12222 | 1.20 | 0.2737 | 0.875 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6713.11 | PM2.5 | -0.13707 | 0.12429 | 1.22 | 0.2701 | 0.872 |
|  |  |  |  | Average Packs | 2.99972 | 0.30310 | 97.95 | <0.0001 | 20.080 |
|  |  |  |  | Years Smoked | -0.53789 | 0.96709 | 0.31 | 0.5781 | 0.584 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02639 | 0.04189 | 0.40 | 0.5287 | 1.027 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00037 | 0.00060 | 0.38 | 0.5372 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.65e-6 | 2.85e-6 | 0.34 | 0.5617 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8760.95 | 8744.99 | PM2.5 | -0.14971 | 0.12341 | 1.47 | 0.2251 | 0.861 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6712.79 | PM2.5 | -0.15499 | 0.12552 | 1.52 | 0.2169 | 0.856 |
|  |  |  |  | Average Packs | 3.00036 | 0.30310 | 97.99 | <0.0001 | 20.093 |
|  |  |  |  | Years Smoked | -0.53692 | 0.96707 | 0.31 | 0.5788 | 0.585 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02635 | 0.04189 | 0.40 | 0.5294 | 1.027 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00037 | 0.00060 | 0.38 | 0.5380 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.65e-6 | 2.85e-6 | 0.34 | 0.5626 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8760.95 | 8745.19 | PM2.5 | -0.13983 | 0.12360 | 1.28 | 0.2579 | 0.870 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6713.08 | PM2.5 | -0.14010 | 0.12585 | 1.24 | 0.2656 | 0.869 |
|  |  |  |  | Average Packs | 2.99943 | 0.30306 | 97.95 | <0.0001 | 20.074 |
|  |  |  |  | Years Smoked | -0.53676 | 0.96704 | 0.31 | 0.5789 | 0.585 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02634 | 0.04189 | 0.40 | 0.5294 | 1.027 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00037 | 0.00060 | 0.38 | 0.5379 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.65e-6 | 2.85e-6 | 0.34 | 0.5625 | 1.000 |

**Section 2: Models using pack-years and different PM2.5 averaging times (with additional variables)**

**Additional covariates included in fully adjusted models:**

* **Median house value in census tract**
* **Median household income in census tract**
* **Body mass index**
* **Overall diet quality**
* **Alcohol consumption**
* **Physical activity**
* **Secondhand smoke from parent in childhood**
* **Secondhand smoke at home**
* **Secondhand smoke at work**
* **Duration of secondhand smoke at home**

**Full Cohort (Current, Never, and Former Smokers)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 21788.31 | 21073.48 | PM2.5 | 0.06417 | 0.08404 | 0.58 | 0.4451 | 1.066 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18494.88 | PM2.5 | 0.05667 | 0.08500 | 0.44 | 0.5050 | 1.058 |
|  |  |  |  | Pack-Years | -0.28488 | 0.47874 | 0.35 | 0.5518 | 0.752 |
|  |  |  |  | Years Smoked | 0.03674 | 0.00213 | 297.55 | <0.0001 | 1.037 |
|  |  |  |  | Months Quit | -0.00004 | 0.00018 | 0.04 | 0.8451 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01493 | 0.02076 | 0.52 | 0.4722 | 1.015 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00022 | 0.00030 | 0.57 | 0.4496 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.07e-6 | 1.42e-6 | 0.57 | 0.4492 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 21788.31 | 21073.48 | PM2.5 | 0.05654 | 0.08474 | 0.44 | 0.5046 | 1.058 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18495.33 | PM2.5 | 0.04740 | 0.08569 | 0.30 | 0.5802 | 1.049 |
|  |  |  |  | Pack-Years | -0.28418 | 0.47874 | 0.35 | 0.5528 | 0.753 |
|  |  |  |  | Years Smoked | 0.03675 | 0.00213 | 297.65 | <0.0001 | 1.037 |
|  |  |  |  | Months Quit | -0.00004 | 0.00018 | 0.04 | 0.8430 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01490 | 0.02076 | 0.51 | 0.4731 | 1.015 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00022 | 0.00030 | 0.57 | 0.4505 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.07e-6 | 1.42e-6 | 0.57 | 0.4501 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 21788.31 | 21073.79 | PM2.5 | 0.04410 | 0.08495 | 0.27 | 0.6037 | 1.045 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18495.50 | PM2.5 | 0.03105 | 0.08592 | 0.13 | 0.7178 | 1.032 |
|  |  |  |  | Pack-Years | -0.28352 | 0.47873 | 0.35 | 0.5537 | 0.753 |
|  |  |  |  | Years Smoked | 0.03675 | 0.00213 | 297.78 | <0.0001 | 1.037 |
|  |  |  |  | Months Quit | -0.00004 | 0.00018 | 0.04 | 0.8390 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01487 | 0.02076 | 0.51 | 0.4740 | 1.015 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00022 | 0.00030 | 0.57 | 0.4515 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.07e-6 | 1.42e-6 | 0.57 | 0.4510 | 1.000 |

**Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 1667.02 | 1687.59 | PM2.5 | 0.23889 | 0.26052 | 0.84 | 0.3592 | 1.270 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 1667.02 | 1687.75 | PM2.5 | 0.21625 | 0.26250 | 0.68 | 0.4100 | 1.241 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 1667.02 | 1687.77 | PM2.5 | 0.21431 | 0.26301 | 0.66 | 0.4152 | 1.239 |

**Never or Former Smokers (Quit for ≥ 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8768.14 | 8646.85 | PM2.5 | 0.18170 | 0.12970 | 1.96 | 0.1613 | 1.199 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 7941.52 | PM2.5 | 0.26565 | 0.13110 | 4.10 | 0.0427 | 1.304 |
|  |  |  |  | Pack-Years | -0.58087 | 1.14325 | 0.26 | 0.6114 | 0.559 |
|  |  |  |  | Years Smoked | 0.03065 | 0.00361 | 72.05 | <0.0001 | 1.031 |
|  |  |  |  | Months Quit | -0.00008 | 0.00023 | 0.13 | 0.7159 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02603 | 0.04836 | 0.29 | 0.5904 | 1.026 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00036 | 0.00068 | 0.28 | 0.5984 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.58 e-6 | 3.16 e-6 | 0.25 | 0.6176 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8768.14 | 8647.17 | PM2.5 | 0.16750 | 0.13062 | 1.64 | 0.1997 | 1.182 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 7941.86 | PM2.5 | 0.25593 | 0.13200 | 3.76 | 0.0525 | 1.292 |
|  |  |  |  | Pack-Years | -0.57732 | 1.14298 | 0.25 | 0.6135 | 0.561 |
|  |  |  |  | Years Smoked | 0.03066 | 0.00361 | 72.10 | <0.0001 | 1.031 |
|  |  |  |  | Months Quit | -0.00008 | 0.00023 | 0.13 | 0.7150 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02587 | 0.04835 | 0.29 | 0.5926 | 1.026 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00036 | 0.00068 | 0.27 | 0.6007 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.57 e-6 | 3.16 e-6 | 0.25 | 0.6199 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8768.14 | 8647.57 | PM2.5 | 0.14610 | 0.13105 | 1.24 | 0.2649 | 1.157 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 7942.50 | PM2.5 | 0.23385 | 0.13240 | 3.12 | 0.0774 | 1.263 |
|  |  |  |  | Pack-Years | -0.57143 | 1.14262 | 0.25 | 0.6170 | 0.565 |
|  |  |  |  | Years Smoked | 0.03067 | 0.00361 | 72.15 | <0.0001 | 1.031 |
|  |  |  |  | Months Quit | -0.00009 | 0.00023 | 0.14 | 0.7120 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02562 | 0.04834 | 0.28 | 0.5960 | 1.026 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00035 | 0.00068 | 0.27 | 0.6041 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.55 e-6 | 3.16 e-6 | 0.24 | 0.6235 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8445.84 | 8386.18 | PM2.5 | -0.10282 | 0.11150 | 0.85 | 0.3564 | 0.902 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8009.53 | PM2.5 | -0.06344 | 0.11327 | 0.31 | 0.5754 | 0.939 |
|  |  |  |  | Pack-Years | -0.22435 | 0.88603 | 0.06 | 0.8001 | 0.799 |
|  |  |  |  | Years Smoked | 0.03184 | 0.00695 | 21.01 | <0.0001 | 1.032 |
|  |  |  |  | Months Quit | 0.00104 | 0.00105 | 0.98 | 0.3209 | 1.001 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01414 | 0.03873 | 0.13 | 0.7150 | 1.014 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00056 | 0.19 | 0.6655 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.29e-6 | 2.69e-6 | 0.23 | 0.6313 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8445.84 | 8386.08 | PM2.5 | -0.10985 | 0.11266 | 0.95 | 0.3295 | 0.896 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8009.44 | PM2.5 | -0.07265 | 0.11438 | 0.40 | 0.5253 | 0.930 |
|  |  |  |  | Pack-Years | -0.22463 | 0.88602 | 0.06 | 0.7999 | 0.799 |
|  |  |  |  | Years Smoked | 0.03184 | 0.00695 | 21.01 | <0.0001 | 1.032 |
|  |  |  |  | Months Quit | 0.00104 | 0.00105 | 0.98 | 0.3210 | 1.001 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01415 | 0.03873 | 0.13 | 0.7148 | 1.014 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00056 | 0.19 | 0.6653 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.29e-6 | 2.69e-6 | 0.23 | 0.6311 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8445.84 | 8386.01 | PM2.5 | -0.11407 | 0.11310 | 1.02 | 0.3132 | 0.892 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8009.31 | PM2.5 | -0.08381 | 0.11487 | 0.53 | 0.4556 | 0.920 |
|  |  |  |  | Pack-Years | -0.22413 | 0.88608 | 0.06 | 0.8003 | 0.799 |
|  |  |  |  | Years Smoked | 0.03185 | 0.00695 | 21.02 | <0.0001 | 1.032 |
|  |  |  |  | Months Quit | 0.00104 | 0.00105 | 0.99 | 0.3206 | 1.001 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01413 | 0.03873 | 0.13 | 0.7152 | 1.014 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00024 | 0.00056 | 0.19 | 0.6657 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.29e-6 | 2.69e-6 | 0.23 | 0.6315 | 1.000 |

**Former Smokers Only**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 5837.27 | 5815.26 | PM2.5 | 0.26919 | 0.15074 | 3.19 | 0.0741 | 1.309 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5423.36 | PM2.5 | 0.30089 | 0.15286 | 3.87 | 0.0490 | 1.351 |
|  |  |  |  | Pack-Years | -0.63181 | 1.41139 | 0.20 | 0.6544 | 0.532 |
|  |  |  |  | Years Smoked | 0.02097 | 0.00944 | 4.94 | 0.0263 | 1.021 |
|  |  |  |  | Months Quit | -0.00091 | 0.00077 | 1.39 | 0.2386 | 0.999 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.03024 | 0.05965 | 0.26 | 0.6121 | 1.031 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00044 | 0.00084 | 0.28 | 0.5952 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 2.10 e-6 | 3.89e-6 | 0.29 | 0.5882 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 5837.27 | 5815.57 | PM2.5 | 0.25726 | 0.15167 | 2.88 | 0.0898 | 1.293 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5423.62 | PM2.5 | 0.29230 | 0.15386 | 3.61 | 0.0575 | 1.340 |
|  |  |  |  | Pack-Years | -0.62891 | 1.41094 | 0.20 | 0.6558 | 0.533 |
|  |  |  |  | Years Smoked | 0.02101 | 0.00944 | 4.95 | 0.0261 | 1.021 |
|  |  |  |  | Months Quit | -0.00091 | 0.00077 | 1.38 | 0.2393 | 0.999 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.03011 | 0.05963 | 0.25 | 0.6135 | 1.031 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00044 | 0.00084 | 0.28 | 0.5967 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 2.10 e-6 | 3.89e-6 | 0.29 | 0.5898 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 5837.27 | 5816.31 | PM2.5 | 0.22288 | 0.15235 | 2.14 | 0.1435 | 1.250 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5424.49 | PM2.5 | 0.25562 | 0.15464 | 2.73 | 0.0983 | 1.291 |
|  |  |  |  | Pack-Years | -0.62056 | 1.41077 | 0.19 | 0.6600 | 0.538 |
|  |  |  |  | Years Smoked | 0.02103 | 0.00944 | 4.96 | 0.0259 | 1.021 |
|  |  |  |  | Months Quit | -0.00091 | 0.00077 | 1.38 | 0.2392 | 0.999 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.02976 | 0.05962 | 0.25 | 0.6177 | 1.030 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00044 | 0.00084 | 0.27 | 0.6009 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 2.07 e-6 | 3.89e-6 | 0.28 | 0.5940 | 1.000 |

**Current or Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8760.95 | 8159.70 | PM2.5 | -0.07878 | 0.12394 | 0.40 | 0.5250 | 0.924 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6642.19 | PM2.5 | -0.11595 | 0.12695 | 0.83 | 0.3610 | 0.891 |
|  |  |  |  | Pack-Years | -0.37806 | 0.64994 | 0.34 | 0.5608 | 0.685 |
|  |  |  |  | Years Smoked | 0.04028 | 0.00284 | 201.00 | <0.0001 | 1.041 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01938 | 0.02838 | 0.47 | 0.4947 | 1.020 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00030 | 0.00041 | 0.52 | 0.4704 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.44e-6 | 1.96e-6 | 0.53 | 0.4645 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8760.95 | 8159.55 | PM2.5 | -0.09360 | 0.12524 | 0.56 | 0.4548 | 0.911 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6641.93 | PM2.5 | -0.13421 | 0.12810 | 1.10 | 0.2948 | 0.874 |
|  |  |  |  | Pack-Years | -0.37754 | 0.64995 | 0.34 | 0.5613 | 0.686 |
|  |  |  |  | Years Smoked | 0.04028 | 0.00284 | 201.00 | <0.0001 | 1.041 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01935 | 0.02838 | 0.46 | 0.4953 | 1.020 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00030 | 0.00041 | 0.52 | 0.4709 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.44e-6 | 1.96e-6 | 0.53 | 0.4649 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8760.95 | 8159.70 | PM2.5 | -0.08211 | 0.12550 | 0.43 | 0.5129 | 0.921 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6642.13 | PM2.5 | -0.12172 | 0.12839 | 0.90 | 0.3431 | 0.885 |
|  |  |  |  | Pack-Years | -0.37660 | 0.64997 | 0.34 | 0.5623 | 0.686 |
|  |  |  |  | Years Smoked | 0.04027 | 0.00284 | 200.96 | <0.0001 | 1.041 |
|  |  |  |  | Pack-Yr-x-Age (Yrs) | 0.01932 | 0.02838 | 0.46 | 0.4961 | 1.020 |
|  |  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00041 | 0.52 | 0.4717 | 1.000 |
|  |  |  |  | Pack-Yr-x-Age Cubed | 1.43e-6 | 1.96e-6 | 0.53 | 0.4657 | 1.000 |

**Section 3: Models using average packs and different PM2.5 averaging times (total pack-years / years smoked, with additional variables)**

**Additional covariates included in fully adjusted models:**

* **Median house value in census tract**
* **Median household income in census tract**
* **Body mass index**
* **Overall diet quality**
* **Alcohol consumption**
* **Physical activity**
* **Secondhand smoke from parent in childhood**
* **Secondhand smoke at home**
* **Secondhand smoke at work**
* **Duration of secondhand smoke at home**

**Full Cohort (Current, Never, and Former Smokers)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 21788.31 | 21073.48 | PM2.5 | 0.06417 | 0.08404 | 0.58 | 0.4451 | 1.066 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18801.11 | PM2.5 | 0.02268 | 0.08440 | 0.07 | 0.7881 | 1.023 |
|  |  |  |  | Average Packs | 1.09035 | 0.13831 | 62.15 | <0.0001 | 2.975 |
|  |  |  |  | Years Smoked | -0.63612 | 0.77972 | 0.66 | 0.4146 | 0.529 |
|  |  |  |  | Months Quit | -0.00077 | 0.00021 | 13.93 | 0.0002 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03145 | 0.03369 | 0.87 | 0.3505 | 1.032 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00045 | 0.00048 | 0.87 | 0.3501 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.05e-6 | 2.28e-6 | 0.81 | 0.3682 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 21788.31 | 21073.62 | PM2.5 | 0.05654 | 0.08474 | 0.44 | 0.5046 | 1.058 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18801.16 | PM2.5 | 0.01532 | 0.08512 | 0.03 | 0.8572 | 1.015 |
|  |  |  |  | Average Packs | 1.09029 | 0.13831 | 62.14 | <0.0001 | 2.975 |
|  |  |  |  | Years Smoked | -0.63555 | 0.77973 | 0.66 | 0.4150 | 0.530 |
|  |  |  |  | Months Quit | -0.00077 | 0.00021 | 13.94 | 0.0002 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03143 | 0.03369 | 0.87 | 0.3509 | 1.032 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00045 | 0.00048 | 0.87 | 0.3501 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.05e-6 | 2.28e-6 | 0.81 | 0.3682 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 21788.31 | 21073.79 | PM2.5 | 0.04410 | 0.08495 | 0.27 | 0.6037 | 1.045 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 21778.31 | 18801.19 | PM2.5 | 0.00168 | 0.08538 | 0.00 | 0.9843 | 1.002 |
|  |  |  |  | Average Packs | 1.09026 | 0.13832 | 62.13 | <0.0001 | 2.975 |
|  |  |  |  | Years Smoked | -0.63459 | 0.77975 | 0.66 | 0.4157 | 0.530 |
|  |  |  |  | Months Quit | -0.00077 | 0.00021 | 13.97 | 0.0002 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03138 | 0.03369 | 0.87 | 0.3516 | 1.032 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00045 | 0.00048 | 0.87 | 0.3512 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.05e-6 | 2.28e-6 | 0.80 | 0.3694 | 1.000 |

**Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 1667.02 | 1687.59 | PM2.5 | 0.23899 | 0.26052 | 0.84 | 0.3592 | 1.270 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 1667.02 | 1687.75 | PM2.5 | 0.21625 | 0.26250 | 0.68 | 0.4100 | 1.241 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 1667.02 | 1687.77 | PM2.5 | 0.21431 | 0.26301 | 0.66 | 0.4152 | 1.239 |

**Never or Former Smokers (Quit for ≥ 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8768.14 | 8646.85 | PM2.5 | 0.18170 | 0.12972 | 1.96 | 0.1613 | 1.199 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 8064.77 | PM2.5 | 0.22114 | 0.13029 | 2.88 | 0.0896 | 1.247 |
|  |  |  |  | Average Packs | 0.70674 | 0.19443 | 13.21 | 0.0003 | 2.027 |
|  |  |  |  | Years Smoked | -0.56718 | 1.55515 | 0.13 | 0.7153 | 0.567 |
|  |  |  |  | Months Quit | -0.00066 | 0.00028 | 5.64 | 0.0175 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02481 | 0.06598 | 0.14 | 0.7069 | 1.025 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00031 | 0.00093 | 0.11 | 0.7372 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.23e-6 | 4.32e-6 | 0.08 | 0.7766 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8768.14 | 8647.17 | PM2.5 | 0.16750 | 0.13062 | 1.64 | 0.1997 | 1.182 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 8065.05 | PM2.5 | 0.21146 | 0.13119 | 2.60 | 0.1070 | 1.235 |
|  |  |  |  | Average Packs | 0.70657 | 0.19443 | 13.20 | 0.0003 | 2.027 |
|  |  |  |  | Years Smoked | -0.56639 | 1.55503 | 0.13 | 0.7157 | 0.568 |
|  |  |  |  | Months Quit | -0.00066 | 0.00028 | 5.64 | 0.0175 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02477 | 0.06597 | 0.14 | 0.7073 | 1.025 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00031 | 0.00093 | 0.11 | 0.7376 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.22e-6 | 4.32e-6 | 0.08 | 0.7772 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8768.14 | 8647.57 | PM2.5 | 0.14610 | 0.13105 | 1.24 | 0.2649 | 1.157 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8768.14 | 8065.55 | PM2.5 | 0.19036 | 0.13154 | 2.09 | 0.1479 | 1.210 |
|  |  |  |  | Average Packs | 0.70619 | 0.19445 | 13.19 | 0.0003 | 2.026 |
|  |  |  |  | Years Smoked | -0.56599 | 1.55482 | 0.13 | 0.7158 | 0.568 |
|  |  |  |  | Months Quit | -0.00066 | 0.00028 | 5.65 | 0.0174 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02475 | 0.06597 | 0.14 | 0.7075 | 1.025 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00031 | 0.00093 | 0.11 | 0.7378 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.22e-6 | 4.32e-6 | 0.08 | 0.7774 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8445.84 | 8386.18 | PM2.5 | -0.10282 | 0.11150 | 0.85 | 0.3564 | 0.902 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8135.80 | PM2.5 | -0.08562 | 0.11225 | 0.58 | 0.4456 | 0.918 |
|  |  |  |  | Average Packs | 3.81467 | 0.29883 | 162.95 | <0.0001 | 45.362 |
|  |  |  |  | Years Smoked | 0.63731 | 3.12937 | 0.04 | 0.8386 | 1.891 |
|  |  |  |  | Months Quit | 0.00278 | 0.00108 | 6.66 | 0.0098 | 1.003 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | -0.02174 | 0.13656 | 0.02 | 0.8735 | 0.978 |
|  |  |  |  | Yrs Smk-x-Age Squared | 0.00030 | 0.00197 | 0.02 | 0.8791 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | -1.46e-6 | 9.46e-6 | 0.02 | 0.8775 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8445.84 | 8386.18 | PM2.5 | -0.10985 | 0.11266 | 0.95 | 0.3295 | 0.896 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8135.69 | PM2.5 | -0.09383 | 0.11339 | 0.68 | 0.4079 | 0.910 |
|  |  |  |  | Average Packs | 3.81484 | 0.29883 | 162.96 | <0.0001 | 45.370 |
|  |  |  |  | Years Smoked | 0.63596 | 3.12967 | 0.04 | 0.8390 | 1.889 |
|  |  |  |  | Months Quit | 0.00278 | 0.00108 | 6.66 | 0.0098 | 1.003 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | -0.02168 | 0.13657 | 0.02 | 0.8739 | 0.979 |
|  |  |  |  | Yrs Smk-x-Age Squared | 0.00030 | 0.00197 | 0.02 | 0.8795 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | -1.45e-6 | 9.46e-6 | 0.02 | 0.8779 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8445.84 | 8386.01 | PM2.5 | -0.11407 | 0.11310 | 1.02 | 0.3132 | 0.892 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8445.84 | 8135.59 | PM2.5 | -0.10115 | 0.11385 | 0.79 | 0.3743 | 0.904 |
|  |  |  |  | Average Packs | 3.81483 | 0.29882 | 162.98 | <0.0001 | 45.369 |
|  |  |  |  | Years Smoked | 0.63996 | 3.13007 | 0.04 | 0.8380 | 1.896 |
|  |  |  |  | Months Quit | 0.00278 | 0.00108 | 6.66 | 0.0098 | 1.003 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | -0.02183 | 0.13659 | 0.02 | 0.8730 | 0.978 |
|  |  |  |  | Yrs Smk-x-Age Squared | 0.00030 | 0.00197 | 0.02 | 0.8787 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | -1.46e-6 | 9.46e-6 | 0.02 | 0.8772 | 1.000 |

**Former Smokers Only**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 5837.27 | 5815.26 | PM2.5 | 0.26916 | 0.15074 | 3.19 | 0.0741 | 1.309 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5550.25 | PM2.5 | 0.24132 | 0.15137 | 2.54 | 0.1109 | 1.273 |
|  |  |  |  | Average Packs | 0.71556 | 0.20607 | 12.06 | 0.0005 | 2.045 |
|  |  |  |  | Years Smoked | -0.60696 | 2.27657 | 0.07 | 0.7898 | 0.545 |
|  |  |  |  | Months Quit | -0.00052 | 0.00077 | 0.45 | 0.5023 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03012 | 0.09731 | 0.09 | 0.7569 | 1.031 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00043 | 0.00138 | 0.10 | 0.7539 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.99 e-6 | 6.48 e-6 | 0.09 | 0.7588 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 5837.27 | 5815.58 | PM2.5 | 0.25726 | 0.15167 | 2.88 | 0.0898 | 1.293 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5550.45 | PM2.5 | 0.23312 | 0.15239 | 2.34 | 0.1261 | 1.263 |
|  |  |  |  | Average Packs | 0.71543 | 0.20604 | 12.06 | 0.0005 | 2.045 |
|  |  |  |  | Years Smoked | -0.61047 | 2.27634 | 0.07 | 0.7886 | 0.543 |
|  |  |  |  | Months Quit | -0.00052 | 0.00077 | 0.45 | 0.5026 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03027 | 0.09730 | 0.10 | 0.7557 | 1.031 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00043 | 0.00138 | 0.10 | 0.7528 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.99 e-6 | 6.48 e-6 | 0.09 | 0.7577 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 5837.27 | 5816.31 | PM2.5 | 0.22288 | 0.15235 | 2.14 | 0.1435 | 1.250 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 5837.27 | 5551.12 | PM2.5 | 0.19760 | 0.15302 | 1.67 | 0.1966 | 1.218 |
|  |  |  |  | Average Packs | 0.71517 | 0.20602 | 12.05 | 0.0005 | 2.045 |
|  |  |  |  | Years Smoked | -0.61482 | 2.27686 | 0.07 | 0.7871 | 0.541 |
|  |  |  |  | Months Quit | -0.00052 | 0.00077 | 0.45 | 0.5014 | 0.999 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.03044 | 0.09732 | 0.10 | 0.7545 | 1.031 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00044 | 0.00138 | 0.10 | 0.7517 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 2.00 e-6 | 6.48 e-6 | 0.10 | 0.7567 | 1.000 |

**Current or Never Smokers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PM** |  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| **72** | 1. | 8760.95 | 8159.70 | PM2.5 | -0.07878 | 0.12394 | 0.40 | 0.5250 | 0.924 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6723.17 | PM2.5 | -0.13658 | 0.12581 | 1.18 | 0.2776 | 0.872 |
|  |  |  |  | Average Packs | 3.01173 | 0.30740 | 95.99 | <0.0001 | 20.322 |
|  |  |  |  | Years Smoked | -0.51884 | 0.96816 | 0.29 | 0.5920 | 0.595 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02537 | 0.04194 | 0.36 | 0.5453 | 1.026 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00035 | 0.00060 | 0.35 | 0.5539 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.56e-6 | 2.85e-6 | 0.31 | 0.5779 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **48** | 1. | 8760.95 | 8159.55 | PM2.5 | -0.09360 | 0.12524 | 0.56 | 0.4548 | 0.911 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6722.86 | PM2.5 | -0.15489 | 0.12714 | 1.48 | 0.2231 | 0.857 |
|  |  |  |  | Average Packs | 3.01256 | 0.30740 | 96.04 | <0.0001 | 20.339 |
|  |  |  |  | Years Smoked | -0.51790 | 0.96812 | 0.29 | 0.5927 | 0.596 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02533 | 0.04194 | 0.36 | 0.5459 | 1.026 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00035 | 0.00060 | 0.35 | 0.5546 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.58e-6 | 2.85e-6 | 0.31 | 0.5786 | 1.000 |
|  |  |  |  |  |  |  |  |  |  |
| **24** | 1. | 8760.95 | 8159.68 | PM2.5 | -0.08211 | 0.12550 | 0.43 | 0.5129 | 0.921 |
|  |  |  |  |  |  |  |  |  |  |
|  | 2. | 8760.95 | 6723.12 | PM2.5 | -0.14115 | 0.12746 | 1.23 | 0.2681 | 0.868 |
|  |  |  |  | Average Packs | 3.01175 | 0.30736 | 96.02 | <0.0001 | 20.323 |
|  |  |  |  | Years Smoked | -0.51782 | 0.96808 | 0.29 | 0.5927 | 0.595 |
|  |  |  |  | Yrs Smk-x-Age (Yrs) | 0.02533 | 0.04194 | 0.36 | 0.5459 | 1.026 |
|  |  |  |  | Yrs Smk-x-Age Squared | -0.00035 | 0.00060 | 0.35 | 0.5546 | 1.000 |
|  |  |  |  | Yrs Smk-x-Age Cubed | 1.58e-6 | 2.85e-6 | 0.31 | 0.5786 | 1.000 |

**Section 4: Models using different baseline age stratifications**

**Section 4.1. Minimally adjusted models**

1. **Age in months and cycle (default) – 503 levels of age in months**
2. **Age in single years and cycle – 42 levels of age in years, from 48 to 89**
3. **Age in 5-year intervals and cycle – 9 levels of 5-year age groups**
4. **Age in 10-year intervals and cycle - 5 levels of 10-year age groups**

97,303 subjects, 721,177 subject-cycle records, 1,990 events (0.3%), 1,402,988.7 person-years of follow-up (records with unknown pack-years deleted).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **HR** | **HR Lower** | **HR Upper** | **p-values** |
| 1. | 21788.88 | 18861.24 | PM2.5 | 1.079 | 0.9145 | 1.2738 | 0.3666 |
|  |  |  | Pack-Years | 0.749 | 0.3223 | 1.7385 | 0.5005 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.017 | 0.9806 | 1.0549 | 0.3641 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9992 | 1.0002 | 0.3133 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.2837 |
|  |  |  |  |  |  |  |  |
| 2. | 31651.01 | 28718.65 | PM2.5 | 1.102 | 0.9354 | 1.2980 | 0.2457 |
|  |  |  | Pack-Years | 0.725 | 0.3271 | 1.6064 | 0.4281 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.018 | 0.9836 | 1.0538 | 0.3065 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9992 | 1.0002 | 0.2648 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.2481 |
|  |  |  |  |  |  |  |  |
| 3. | 37858.95 | 34923.77 | PM2.5 | 1.094 | 0.9287 | 1.2886 | 0.2824 |
|  |  |  | Pack-Years | 0.762 | 0.3737 | 1.5538 | 0.4546 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.015 | 0.9846 | 1.0473 | 0.3290 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9993 | 1.0002 | 0.2901 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.2694 |
|  |  |  |  |  |  |  |  |
| 4. | 40220.35 | 37264.86 | PM2.5 | 1.096 | 0.9304 | 1.2911 | 0.2727 |
|  |  |  | Pack-Years | 0.853 | 0.4619 | 1.5750 | 0.6112 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.009 | 0.9826 | 1.0362 | 0.5072 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9995 | 1.0003 | 0.5048 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.5169 |

**Section 4.2. Fully adjusted models**

1. **Age in months and cycle (default) – 503 levels of age in months**
2. **Age in single years and cycle – 42 levels of age in years, from 48 to 89**
3. **Age in 5-year intervals and cycle – 9 levels of 5-year age groups**
4. **Age in 10-year intervals and cycle - 5 levels of 10-year age groups**

97,303 subjects, 721,177 subject-cycle records, 1,990 events (0.3%), 1,402,988.7 person-years of follow-up (records with unknown pack-years deleted).

**Additional covariates included in fully adjusted models:**

* **Median house value in census tract**
* **Median household income in census tract**
* **Body mass index**
* **Overall diet quality**
* **Alcohol consumption**
* **Physical activity**
* **Secondhand smoke from parent in childhood**
* **Secondhand smoke at home**
* **Secondhand smoke at work**
* **Duration of secondhand smoke at home**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **HR** | **HR Lower** | **HR Upper** | **p-values** |
| 1. | 21788.88 | 18861.24 | PM2.5 | 1.079 | 0.9145 | 1.2738 | 0.3666 |
|  |  |  | Pack-Years | 0.749 | 0.3223 | 1.7385 | 0.5005 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.017 | 0.9806 | 1.0549 | 0.3641 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9992 | 1.0002 | 0.3133 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.2837 |
|  |  |  |  |  |  |  |  |
| 2. | 31651.01 | 28718.65 | PM2.5 | 1.102 | 0.9354 | 1.2980 | 0.2457 |
|  |  |  | Pack-Years | 0.725 | 0.3271 | 1.6064 | 0.4281 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.018 | 0.9836 | 1.0538 | 0.3065 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9992 | 1.0002 | 0.2648 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.2481 |
|  |  |  |  |  |  |  |  |
| 3. | 37858.95 | 34923.77 | PM2.5 | 1.094 | 0.9287 | 1.2886 | 0.2824 |
|  |  |  | Pack-Years | 0.762 | 0.3737 | 1.5538 | 0.4546 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.015 | 0.9846 | 1.0473 | 0.3290 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9993 | 1.0002 | 0.2901 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.2694 |
|  |  |  |  |  |  |  |  |
| 4. | 40220.35 | 37264.86 | PM2.5 | 1.096 | 0.9304 | 1.2911 | 0.2727 |
|  |  |  | Pack-Years | 0.853 | 0.4619 | 1.5750 | 0.6112 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 1.009 | 0.9826 | 1.0362 | 0.5072 |
|  |  |  | Pack-Yr-x-Age Squared | 1.000 | 0.9995 | 1.0003 | 0.5048 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.000 | 1.0000 | 1.0000 | 0.5169 |

**Section 5: Models using different PM size fractions**

**Section 5.1: PM10**

**Full Cohort, Based on Pack-Years of Smoking**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,829.1 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21795.29 | PM10 | 0.04394 | 0.04594 | 0.91 | 0.3389 | 1.045 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19734.36 | PM10 | 0.04292 | 0.04644 | 0.85 | 0.3553 | 1.044 |
|  |  |  | Current v Never | 3.25414 | 0.08446 | 1484.58 | <0.0001 | 25.897 |
|  |  |  | Former v Never | 1.86354 | 0.08077 | 532.36 | <0.0001 | 6.447 |
|  |  |  |  |  |  |  |  |  |
| 3. | 21810.08 | 18721.45 | PM10 | 0.03349 | 0.04661 | 0.51 | 0.4725 | 1.034 |
|  |  |  | Current v Never | 1.40518 | 0.10476 | 179.90 | <0.0001 | 4.076 |
|  |  |  | Former v Never | 0.96338 | 0.08774 | 120.56 | <0.0001 | 2.621 |
|  |  |  | Pack-Years | 0.03113 | 0.00092 | 1143.02 | <0.0001 | 1.032 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18550.36 | PM10 | 0.02325 | 0.04663 | 0.25 | 0.6180 | 1.024 |
|  |  |  | Current v Never | 0.18475 | 0.14328 | 1.66 | 0.1972 | 1.203 |
|  |  |  | Former v Never | 0.13154 | 0.11343 | 1.34 | 0.2462 | 1.141 |
|  |  |  | Pack-Years | 0.02219 | 0.00114 | 375.64 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03594 | 0.00277 | 168.27 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18545.54 | PM10 | 0.02228 | 0.04662 | 0.23 | 0.6372 | 1.023 |
|  |  |  | Current v Never | 0.72061 | 0.24606 | 8.58 | 0.0034 | 2.056 |
|  |  |  | Former v Never | 0.70822 | 0.24415 | 8.41 | 0.0037 | 2.030 |
|  |  |  | Pack-Years | 0.02240 | 0.00115 | 380.25 | <0.0001 | 1.023 |
|  |  |  | Years Smoked | 0.02508 | 0.00490 | 26.17 | <0.0001 | 1.025 |
|  |  |  | Months Quit | -0.00111 | 0.00042 | 7.01 | 0.0081 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 21810.08 | 18549.92 | PM10 | 0.02226 | 0.04663 | 0.23 | 0.6332 | 1.023 |
|  |  |  | Pack-Years | 0.02213 | 0.00114 | 377.19 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03823 | 0.00208 | 337.35 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00006 | 0.00018 | 0.11 | 0.7440 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 21810.08 | 18509.62 | PM10 | 0.02149 | 0.04660 | 0.21 | 0.6446 | 1.022 |
|  |  |  | Pack-Years | 0.07576 | 0.00832 | 82.95 | <0.0001 | 1.079 |
|  |  |  | Years Smoked | 0.03852 | 0.00207 | 346.712 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.07 | 0.7867 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00075 | 0.00011 | 41.90 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 21810.08 | 18511.62 | PM10 | 0.02152 | 0.04660 | 0.21 | 0.6442 | 1.022 |
|  |  |  | Pack-Years | 0.08025 | 0.06737 | 1.42 | 0.2336 | 1.084 |
|  |  |  | Years Smoked | 0.03851 | 0.00208 | 344.31 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.07 | 0.7853 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00087 | 0.00191 | 0.21 | 0.6471 | 0.999 |
|  |  |  | Pack-Yr-x-Age Squared | 9.04 e-7 | 0.00003 | 0.01 | 0.9465 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 21810.08 | 18512.98 | PM10 | 0.02173 | 0.04659 | 0.22 | 0.6410 | 1.022 |
|  |  |  | Pack-Years | -0.29529 | 0.47783 | 0.38 | 0.5366 | 0.744 |
|  |  |  | Years Smoked | 0.03848 | 0.00208 | 343.78 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.08 | 0.7806 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01552 | 0.02073 | 0.56 | 0.4542 | 1.016 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00023 | 0.00030 | 0.62 | 0.4293 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.13e-6 | 1.42e-6 | 0.63 | 0.4270 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 21810.08 | 18878.82 | PM10 | 0.03340 | 0.04658 | 0.51 | 0.4734 | 1.034 |
|  |  |  | Pack-Years | -0.28394 | 0.42972 | 0.44 | 0.5087 | 0.753 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01666 | 0.01862 | 0.80 | 0.3707 | 1.017 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00027 | 0.00027 | 0.99 | 0.3192 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.35e-6 | 1.27e-6 | 1.12 | 0.2894 | 1.000 |

**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up.

**Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1667.85 | PM10 | 0.10250 | 0.13822 | 0.55 | 0.4583 | 1.108 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years), Based on Pack-Years of Smoking**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8777.60 | PM10 | 0.09265 | 0.07044 | 1.73 | 0.1884 | 1.097 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8380.45 | PM10 | 0.13065 | 0.07092 | 3.39 | 0.0654 | 1.140 |
|  |  |  | Former v Never | 1.51921 | 0.08476 | 321.23 | <0.0001 | 4.569 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8778.12 | 7986.66 | PM10 | 0.13513 | 0.07153 | 3.57 | 0.0589 | 1.145 |
|  |  |  | Former v Never | 0.61455 | 0.10082 | 37.15 | <0.0001 | 1.849 |
|  |  |  | Pack-Years | 0.03607 | 0.00166 | 473.09 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 7943.96 | PM10 | 0.12770 | 0.07159 | 3.18 | 0.0745 | 1.136 |
|  |  |  | Former v Never | 0.08895 | 0.13299 | 0.45 | 0.5036 | 1.093 |
|  |  |  | Pack-Years | 0.02624 | 0.00222 | 139.29 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03051 | 0.00455 | 45.00 | <0.0001 | 1.031 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8778.12 | 7943.96 | PM10 | 0.12714 | 0.07157 | 3.16 | 0.0757 | 1.136 |
|  |  |  | Former v Never | 0.79394 | 0.37027 | 4.60 | 0.0320 | 2.212 |
|  |  |  | Pack-Years | 0.02645 | 0.00223 | 140.73 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.01794 | 0.00764 | 5.52 | 0.0188 | 1.018 |
|  |  |  | Months Quit | -0.00127 | 0.00063 | 4.10 | 0.0428 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8778.12 | 7939.27 | PM10 | 0.12514 | 0.07154 | 3.06 | 0.0802 | 1.133 |
|  |  |  | Former v Never | 0.51641 | 0.40047 | 1.66 | 0.1972 | 1.676 |
|  |  |  | Pack-Years | -0.62394 | 1.15209 | 0.29 | 0.5881 | 0.536 |
|  |  |  | Years Smoked | 0.02293 | 0.00807 | 8.08 | 0.0045 | 1.023 |
|  |  |  | Months Quit | -0.00083 | 0.00066 | 1.59 | 0.2077 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02766 | 0.04869 | 0.32 | 0.5700 | 1.028 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00038 | 0.00068 | 0.31 | 0.5791 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.67e-6 | 3.17e-6 | 0.28 | 0.5981 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 7944.41 | PM10 | 0.12649 | 0.07160 | 3.12 | 0.0773 | 1.135 |
|  |  |  | Pack-Years | 0.02612 | 0.00222 | 138.60 | <0.0001 | 1.026 |
|  |  |  | Years Smoked | 0.03250 | 0.00352 | 85.14 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00002 | 0.00022 | 0.01 | 0.9466 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 7935.36 | PM10 | 0.12454 | 0.07154 | 3.03 | 0.0817 | 1.133 |
|  |  |  | Pack-Years | 0.08530 | 0.01771 | 23.20 | <0.0001 | 1.089 |
|  |  |  | Years Smoked | 0.03221 | 0.00351 | 84.07 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00004 | 0.00022 | 0.03 | 0.8668 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00079 | 0.00024 | 11.22 | 0.0008 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 7937.06 | PM10 | 0.12417 | 0.07155 | 3.01 | 0.0827 | 1.132 |
|  |  |  | Pack-Years | 0.00023 | 0.15638 | 0.00 | 0.9988 | 1.000 |
|  |  |  | Years Smoked | 0.03232 | 0.00352 | 84.38 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00003 | 0.00022 | 0.02 | 0.8840 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.00156 | 0.00431 | 0.13 | 0.7167 | 1.002 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00002 | 0.00003 | 0.30 | 0.5873 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 7938.88 | PM10 | 0.12452 | 0.07155 | 3.03 | 0.0818 | 1.133 |
|  |  |  | Pack-Years | -0.46640 | 1.13691 | 0.17 | 0.6816 | 0.627 |
|  |  |  | Years Smoked | 0.03229 | 0.00352 | 84.22 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00003 | 0.00022 | 0.02 | 0.8865 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02144 | 0.04812 | 0.20 | 0.6559 | 1.022 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00067 | 0.19 | 0.6609 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.31e-6 | 3.14e-6 | 0.17 | 0.6778 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8778.12 | 8016.26 | PM10 | 0.12529 | 0.07151 | 3.07 | 0.0798 | 1.133 |
|  |  |  | Pack-Years | -0.47902 | 1.06340 | 0.20 | 0.6524 | 0.619 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02389 | 0.04494 | 0.28 | 0.5950 | 1.024 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00035 | 0.00063 | 0.30 | 0.5810 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.62e-6 | 2.93e-6 | 0.31 | 0.5798 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years), Based on Pack-Years of Smoking**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8449.94 | PM10 | -0.04259 | 0.06203 | 0.47 | 0.4923 | 0.958 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8396.61 | PM10 | -0.04478 | 0.06206 | 0.52 | 0.4706 | 0.956 |
|  |  |  | Current v Former | 0.45298 | 0.06170 | 53.90 | <0.0001 | 1.573 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8051.37 | PM10 | -0.03877 | 0.06254 | 0.38 | 0.5353 | 0.962 |
|  |  |  | Current v Former | 0.18798 | 0.06368 | 8.71 | 0.0032 | 1.207 |
|  |  |  | Pack-Years | 0.02382 | 0.00126 | 360.20 | <0.0001 | 1.024 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8024.72 | PM10 | -0.03908 | 0.06254 | 0.39 | 0.5321 | 0.962 |
|  |  |  | Current v Former | 0.03252 | 0.07032 | 0.21 | 0.6437 | 1.033 |
|  |  |  | Pack-Years | 0.02087 | 0.00137 | 230.89 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03312 | 0.00652 | 25.82 | <0.0001 | 1.034 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8454.28 | 8026.17 | PM10 | -0.03938 | 0.06254 | 0.40 | 0.5289 | 0.961 |
|  |  |  | Current v Former | 0.08738 | 0.10316 | 0.72 | 0.3970 | 1.091 |
|  |  |  | Pack-Years | 0.02085 | 0.00137 | 230.10 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03480 | 0.00695 | 25.08 | <0.0001 | 1.035 |
|  |  |  | Months Quit | 0.00111 | 0.00151 | 0.54 | 0.4611 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8454.28 | 8016.86 | PM10 | -0.04011 | 0.06243 | 0.41 | 0.5207 | 0.961 |
|  |  |  | Current v Former | 0.08714 | 0.10306 | 0.71 | 0.3978 | 1.091 |
|  |  |  | Pack-Years | -0.32921 | 0.88518 | 0.14 | 0.7100 | 0.719 |
|  |  |  | Years Smoked | 0.03337 | 0.00691 | 23.33 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00111 | 0.00150 | 0.55 | 0.4591 | 1.001 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01892 | 0.03871 | 0.24 | 0.6251 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00056 | 0.31 | 0.5761 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.63e-6 | 2.69e-6 | 0.37 | 0.5428 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8024.90 | PM10 | -0.03882 | 0.06254 | 0.38 | 0.5348 | 0.962 |
|  |  |  | Pack-Years | 0.02089 | 0.00137 | 231.44 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03507 | 0.00694 | 25.51 | <0.0001 | 1.036 |
|  |  |  | Months Quit | 0.00018 | 0.00104 | 0.03 | 0.8619 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8013.29 | PM10 | -0.03980 | 0.06243 | 0.41 | 0.5238 | 0.961 |
|  |  |  | Pack-Years | 0.07228 | 0.01397 | 26.78 | <0.0001 | 1.075 |
|  |  |  | Years Smoked | 0.03402 | 0.00689 | 24.39 | <0.0001 | 1.035 |
|  |  |  | Months Quit | 0.00022 | 0.00103 | 0.04 | 0.8329 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00072 | 0.00020 | 13.64 | 0.0002 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8013.94 | PM10 | -0.03924 | 0.06243 | 0.39 | 0.5297 | 0.962 |
|  |  |  | Pack-Years | 0.20548 | 0.11526 | 3.18 | 0.0746 | 1.228 |
|  |  |  | Years Smoked | 0.03367 | 0.00690 | 23.81 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00019 | 0.00103 | 0.03 | 0.8503 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00457 | 0.00331 | 1.91 | 0.1674 | 0.995 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00003 | 0.00002 | 1.35 | 0.2444 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8013.94 | PM10 | -0.03962 | 0.06242 | 0.40 | 0.5256 | 0.961 |
|  |  |  | Pack-Years | -0.31799 | 0.88503 | 0.13 | 0.7194 | 0.728 |
|  |  |  | Years Smoked | 0.03364 | 0.00690 | 23.74 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00019 | 0.00103 | 0.03 | 0.8572 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01843 | 0.03870 | 0.23 | 0.6339 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00056 | 0.30 | 0.5845 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.60e-6 | 2.69e-6 | 0.35 | 0.5509 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8454.28 | 8045.88 | PM10 | -0.03828 | 0.06242 | 0.38 | 0.5397 | 0.962 |
|  |  |  | Pack-Years | -0.30897 | 0.86632 | 0.13 | 0.7241 | 0.734 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01869 | 0.03787 | 0.24 | 0.6216 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00032 | 0.00055 | 0.33 | 0.5634 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.68e-6 | 2.63e-6 | 0.41 | 0.5226 | 1.000 |

**Former Smokers Only (Quit for ≥ 10 Years), Based on Pack-Years of Smoking**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown pack-years, unknown years smoked, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5848.17 | PM10 | 0.14763 | 0.08295 | 3.17 | 0.0751 | 1.159 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5456.74 | PM10 | 0.15539 | 0.08410 | 3.41 | 0.0646 | 1.168 |
|  |  |  | Pack-Years | 0.03635 | 0.00169 | 462.44 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5410.63 | PM10 | 0.14572 | 0.08416 | 3.00 | 0.0834 | 1.157 |
|  |  |  | Pack-Years | 0.02619 | 0.00224 | 136.48 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03253 | 0.00470 | 47.98 | <0.0001 | 1.033 |
|  |  |  |  |  |  |  |  |  |
| 4. | 5845.55 | 5411.84 | PM10 | 0.14526 | 0.08413 | 2.98 | 0.0842 | 1.156 |
|  |  |  | Pack-Years | 0.02632 | 0.00225 | 137.05 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.02512 | 0.00947 | 7.03 | 0.0080 | 1.025 |
|  |  |  | Months Quit | -0.00069 | 0.00077 | 0.80 | 0.3706 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 5845.55 | 5408.03 | PM10 | 0.14249 | 0.08405 | 2.87 | 0.0900 | 1.153 |
|  |  |  | Pack-Years | 0.08037 | 0.02235 | 12.93 | 0.0003 | 1.084 |
|  |  |  | Years Smoked | 0.02380 | 0.00943 | 6.38 | 0.0116 | 0.999 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.98 | 0.3232 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00072 | 0.00030 | 5.88 | 0.0153 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 5845.55 | 5409.95 | PM10 | 0.14271 | 0.08405 | 2.88 | 0.0895 | 1.153 |
|  |  |  | Pack-Years | 0.13663 | 0.19849 | 0.47 | 0.4912 | 1.146 |
|  |  |  | Years Smoked | 0.02375 | 0.00943 | 6.35 | 0.0118 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.97 | 0.3239 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00228 | 0.00546 | 0.17 | 0.6764 | 0.998 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00001 | 0.00004 | 0.08 | 0.7755 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 5C. | 5845.55 | 5411.73 | PM10 | 0.14349 | 0.08406 | 2.91 | 0.0878 | 1.154 |
|  |  |  | Pack-Years | -0.50865 | 1.40754 | 0.13 | 0.7178 | 0.601 |
|  |  |  | Years Smoked | 0.02369 | 0.00943 | 6.32 | 0.0119 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.98 | 0.3221 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02518 | 0.05950 | 0.18 | 0.6722 | 1.025 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00038 | 0.00083 | 0.20 | 0.6524 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.80e-6 | 3.88e-6 | 0.21 | 0.6427 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 5845.55 | 5454.83 | PM10 | 0.15362 | 0.08403 | 3.34 | 0.0675 | 1.166 |
|  |  |  | Pack-Years | -0.51252 | 1.36072 | 0.14 | 0.7064 | 0.599 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02673 | 0.05748 | 0.22 | 0.6419 | 1.027 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00041 | 0.00081 | 0.26 | 0.6108 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 2.01e-6 | 3.75e-6 | 0.29 | 0.5914 | 1.000 |

**Full Cohort, Based on Average Packs / Year**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,829.1 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21795.29 | PM10 | 0.04394 | 0.04594 | 0.91 | 0.3389 | 1.045 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19734.36 | PM10 | 0.04292 | 0.04644 | 0.85 | 0.3553 | 1.044 |
|  |  |  | Current v Never | 3.25414 | 0.08446 | 1484.58 | <0.0001 | 25.897 |
|  |  |  | Former v Never | 1.86354 | 0.08077 | 532.36 | <0.0001 | 6.447 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18872.04 | PM10 | 0.01583 | 0.04659 | 0.11 | 0.7340 | 1.016 |
|  |  |  | Current v Never | -0.30121 | 0.15980 | 3.55 | 0.0594 | 0.740 |
|  |  |  | Former v Never | -0.38206 | 0.12933 | 8.73 | 0.0031 | 0.682 |
|  |  |  | Average Packs | 1.00699 | 0.13990 | 51.81 | <0.0001 | 2.737 |
|  |  |  | Years Smoked | 0.06870 | 0.00252 | 741.05 | <0.0001 | 1.071 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18570.23 | PM10 | 0.01543 | 0.04658 | 0.11 | 0.7404 | 1.016 |
|  |  |  | Current v Never | 0.08231 | 0.25021 | 0.11 | 0.7422 | 1.086 |
|  |  |  | Former v Never | 0.03327 | 0.24602 | 0.02 | 0.8924 | 1.034 |
|  |  |  | Average Packs | 1.03455 | 0.14024 | 54.42 | <0.0001 | 2.814 |
|  |  |  | Years Smoked | 0.06099 | 0.00461 | 174.93 | <0.0001 | 1.063 |
|  |  |  | Months Quit | -0.00083 | 0.00042 | 3.89 | 0.0485 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 21810.08 | 18866.86 | PM10 | 0.01556 | 0.04658 | 0.11 | 0.7383 | 1.016 |
|  |  |  | Average Packs | 1.06064 | 0.13423 | 62.43 | <0.0001 | 2.888 |
|  |  |  | Years Smoked | 0.06261 | 0.00153 | 1637.99 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00085 | 0.00020 | 17.23 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 21810.08 | 18868.51 | PM10 | 0.01553 | 0.04658 | 0.11 | 0.7388 | 1.016 |
|  |  |  | Average Packs | 0.45320 | 1.02971 | 0.19 | 0.6598 | 1.573 |
|  |  |  | Years Smoked | 0.06209 | 0.00154 | 1633.25 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.55 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00895 | 0.01495 | 0.36 | 0.5493 | 1.009 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 21810.08 | 18869.20 | PM10 | 0.01588 | 0.04658 | 0.12 | 0.7331 | 1.016 |
|  |  |  | Average Packs | 3.24320 | 2.63088 | 1.52 | 0.2177 | 25.616 |
|  |  |  | Years Smoked | 0.06206 | 0.00154 | 1631.85 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.64 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.07692 | 0.07623 | 1.02 | 0.3130 | 0.926 |
|  |  |  | Ave Pck-x-Age Squared | 0.00065 | 0.00057 | 1.32 | 0.2504 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 21810.08 | 18870.41 | PM10 | 0.01600 | 0.04657 | 0.12 | 0.7312 | 1.016 |
|  |  |  | Average Packs | 1.61259 | 3.36704 | 0.23 | 0.6320 | 5.016 |
|  |  |  | Years Smoked | 0.06206 | 0.00154 | 1631.17 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.66 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.10255 | 0.08199 | 1.56 | 0.2110 | 0.903 |
|  |  |  | Ave Pck-x-Age Squared | 0.00246 | 0.00217 | 1.28 | 0.2577 | 1.002 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00001 | 0.00002 | 0.73 | 0.3931 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 21810.08 | 18886.14 | PM10 | 0.01986 | 0.04659 | 0.18 | 0.6700 | 1.020 |
|  |  |  | Average Packs | 1.35328 | 3.57407 | 0.14 | 0.7050 | 3.870 |
|  |  |  | Years Smoked | 0.06552 | 0.00139 | 2215.29 | <0.0001 | 1.068 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.10251 | 0.08132 | 1.59 | 0.2074 | 0.903 |
|  |  |  | Ave Pck-x-Age Squared | 0.00254 | 0.00231 | 1.21 | 0.2721 | 1.003 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.71 | 0.3986 | 1.000 |

**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up.

**Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1667.85 | PM10 | 0.10250 | 0.13822 | 0.55 | 0.4583 | 1.108 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years), Based on Average Packs / Year**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8777.60 | PM10 | 0.09265 | 0.07044 | 1.73 | 0.1884 | 1.097 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8380.45 | PM10 | 0.13065 | 0.07092 | 3.39 | 0.0654 | 1.140 |
|  |  |  | Former v Never | 1.51921 | 0.08476 | 321.23 | <0.0001 | 4.569 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 8067.28 | PM10 | 0.11627 | 0.07144 | 2.65 | 0.1036 | 1.123 |
|  |  |  | Former v Never | -0.25825 | 0.16191 | 2.54 | 0.1107 | 0.772 |
|  |  |  | Average Packs | 0.61665 | 0.19821 | 9.68 | 0.0019 | 1.853 |
|  |  |  | Years Smoked | 0.06493 | 0.00399 | 264.92 | <0.0001 | 1.067 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8778.12 | 8066.47 | PM10 | 0.11587 | 0.07144 | 2.63 | 0.1048 | 1.123 |
|  |  |  | Former v Never | 0.32185 | 0.37667 | 0.73 | 0.3928 | 1.380 |
|  |  |  | Average Packs | 0.62878 | 0.19848 | 10.04 | 0.0015 | 1.875 |
|  |  |  | Years Smoked | 0.05481 | 0.00713 | 59.16 | <0.0001 | 1.056 |
|  |  |  | Months Quit | -0.00106 | 0.00062 | 2.870 | 0.0899 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8778.12 | 8069.38 | PM10 | 0.11626 | 0.07145 | 2.65 | 0.1037 | 1.123 |
|  |  |  | Former v Never | 0.35521 | 0.37993 | 0.87 | 0.3498 | 1.426 |
|  |  |  | Average Packs | 4.93226 | 4.58357 | 1.16 | 0.2819 | 138.692 |
|  |  |  | Years Smoked | 0.05415 | 0.00718 | 56.86 | <0.0001 | 1.056 |
|  |  |  | Months Quit | -0.00113 | 0.00063 | 3.15 | 0.0759 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22906 | 0.13676 | 2.80 | 0.0939 | 0.795 |
|  |  |  | Ave Pck-x-Age Squared | 0.00374 | 0.00299 | 1.56 | 0.2110 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.68 | 0.4082 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 8065.19 | PM10 | 0.11566 | 0.07144 | 2.62 | 0.1055 | 1.123 |
|  |  |  | Average Packs | 0.66505 | 0.19151 | 12.06 | 0.0005 | 1.945 |
|  |  |  | Years Smoked | 0.06057 | 0.00231 | 689.00 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.57 | 0.0324 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 8067.17 | PM10 | 0.11569 | 0.07144 | 2.62 | 0.1054 | 1.123 |
|  |  |  | Average Packs | 0.49047 | 1.36188 | 0.13 | 0.7187 | 1.633 |
|  |  |  | Years Smoked | 0.06058 | 0.00231 | 689.10 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.56 | 0.0326 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00255 | 0.01956 | 0.02 | 0.8968 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 8066.98 | PM10 | 0.11579 | 0.07146 | 2.62 | 0.1052 | 1.123 |
|  |  |  | Average Packs | 6.26227 | 1.36188 | 2.37 | 0.1239 | 524.410 |
|  |  |  | Years Smoked | 0.06054 | 0.00231 | 687.77 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.61 | 0.0318 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.17331 | 0.11932 | 2.11 | 0.1464 | 0.841 |
|  |  |  | Ave Pck-x-Age Squared | 0.00132 | 0.00088 | 2.22 | 0.1356 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 8068.24 | PM10 | 0.11602 | 0.07146 | 2.62 | 0.1045 | 1.123 |
|  |  |  | Average Packs | 5.10264 | 4.53198 | 1.27 | 0.2602 | 164.455 |
|  |  |  | Years Smoked | 0.06052 | 0.00231 | 686.83 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00059 | 0.00027 | 4.69 | 0.0303 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22925 | 0.13701 | 2.80 | 0.0943 | 0.795 |
|  |  |  | Ave Pck-x-Age Squared | 0.00371 | 0.00297 | 1.56 | 0.2117 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.69 | 0.4051 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8778.12 | 8070.99 | PM10 | 0.11834 | 0.07151 | 2.74 | 0.0976 | 1.126 |
|  |  |  | Average Packs | 5.02655 | 4.67024 | 1.16 | 0.2818 | 152.407 |
|  |  |  | Years Smoked | 0.05969 | 0.00232 | 664.26 | <0.0001 | 1.062 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22775 | 0.13571 | 2.82 | 0.0933 | 0.796 |
|  |  |  | Ave Pck-x-Age Squared | 0.00365 | 0.00307 | 1.42 | 0.2340 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.62 | 0.4321 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years), Based on Average Packs / Year**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8449.94 | PM10 | -0.04259 | 0.06203 | 0.47 | 0.4923 | 0.958 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8396.61 | PM10 | -0.04478 | 0.06206 | 0.52 | 0.4706 | 0.956 |
|  |  |  | Current v Former | 0.45298 | 0.06170 | 53.90 | <0.0001 | 1.573 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8150.90 | PM10 | -0.04456 | 0.06216 | 0.51 | 0.4735 | 0.956 |
|  |  |  | Current v Former | -0.03987 | 0.07056 | 0.32 | 0.5721 | 0.961 |
|  |  |  | Average Packs | 3.62725 | 0.28178 | 165.71 | <0.0001 | 37.609 |
|  |  |  | Years Smoked | 0.08461 | 0.00652 | 168.23 | <0.0001 | 1.088 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8149.22 | PM10 | -0.04477 | 0.06216 | 0.52 | 0.4713 | 0.956 |
|  |  |  | Average Packs | 3.57887 | 0.26780 | 178.59 | <0.0001 | 35.833 |
|  |  |  | Years Smoked | 0.08286 | 0.00570 | 211.04 | <0.0001 | 1.086 |
|  |  |  |  |  |  |  |  |  |
| 5. | 8454.28 | 8148.97 | PM10 | -0.04541 | 0.06218 | 0.53 | 0.4652 | 0.956 |
|  |  |  | Current v Former | 0.10360 | 0.10280 | 1.01 | 0.3135 | 1.109 |
|  |  |  | Average Packs | 3.74326 | 0.29051 | 166.02 | <0.0001 | 42.235 |
|  |  |  | Years Smoked | 0.08965 | 0.00713 | 157.93 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00301 | 0.00152 | 3.93 | 0.0473 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8148.00 | PM10 | -0.04485 | 0.06217 | 0.52 | 0.4707 | 0.956 |
|  |  |  | Average Packs | 3.76354 | 0.28991 | 168.53 | <0.0001 | 43.101 |
|  |  |  | Years Smoked | 0.09010 | 0.00712 | 160.07 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00191 | 0.00106 | 3.24 | 0.0716 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8149.83 | PM10 | -0.04569 | 0.06222 | 0.54 | 0.4627 | 0.955 |
|  |  |  | Average Packs | 2.71457 | 2.58335 | 1.10 | 0.2934 | 15.098 |
|  |  |  | Years Smoked | 0.09032 | 0.00715 | 159.69 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00194 | 0.00106 | 3.32 | 0.0685 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01551 | 0.03789 | 0.17 | 0.6822 | 1.016 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8151.25 | PM10 | -0.04519 | 0.06222 | 0.53 | 0.4677 | 0.956 |
|  |  |  | Average Packs | 4.79839 | 3.76207 | 1.63 | 0.2021 | 121.315 |
|  |  |  | Years Smoked | 0.09049 | 0.00716 | 159.85 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00197 | 0.00106 | 3.41 | 0.0648 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.05719 | 0.10257 | 0.31 | 0.5772 | 0.944 |
|  |  |  | Ave Pck-x-Age Squared | 0.00061 | 0.00080 | 0.58 | 0.4453 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8151.70 | PM10 | -0.04457 | 0.06225 | 0.52 | 0.4740 | 0.956 |
|  |  |  | Average Packs | 15.38815 | 9.13338 | 2.84 | 0.0920 | >999 |
|  |  |  | Years Smoked | 0.09049 | 0.00714 | 160.71 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00194 | 0.00106 | 3.33 | 0.0681 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.04192 | 0.10329 | 0.16 | 0.6849 | 0.959 |
|  |  |  | Ave Pck-x-Age Squared | -0.00682 | 0.00592 | 1.33 | 0.2493 | 0.993 |
|  |  |  | Ave Pck-x-Age Cubed | 0.00007 | 0.00006 | 1.61 | 0.2044 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Former Smokers Only (Quit for ≥ 10 Years), Based on Average Packs / Year**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5848.17 | PM10 | 0.14763 | 0.08295 | 3.17 | 0.0751 | 1.159 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5532.03 | PM10 | 0.13053 | 0.08388 | 2.42 | 0.1197 | 1.139 |
|  |  |  | Average Packs | 0.61345 | 0.19996 | 9.41 | 0.0022 | 1.847 |
|  |  |  | Years Smoked | 0.06719 | 0.00415 | 261.60 | <0.0001 | 1.069 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5533.80 | PM10 | 0.13030 | 0.08387 | 2.41 | 0.1203 | 1.139 |
|  |  |  | Average Packs | 0.61777 | 0.20002 | 9.54 | 0.0020 | 1.855 |
|  |  |  | Years Smoked | 0.06329 | 0.00903 | 49.12 | <0.0001 | 1.065 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6280 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 4A. | 5845.55 | 5535.23 | PM10 | 0.13062 | 0.08388 | 2.43 | 0.1194 | 1.140 |
|  |  |  | Average Packs | -0.53073 | 1.56540 | 0.11 | 0.7346 | 0.588 |
|  |  |  | Years Smoked | 0.06369 | 0.00903 | 49.73 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6272 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01660 | 0.02220 | 0.56 | 0.4547 | 1.017 |
|  |  |  |  |  |  |  |  |  |
| 4B. | 5845.55 | 5534.05 | PM10 | 0.13022 | 0.08392 | 2.41 | 0.1207 | 1.139 |
|  |  |  | Average Packs | 6.57041 | 4.20372 | 2.44 | 0.1181 | 713.660 |
|  |  |  | Years Smoked | 0.06369 | 0.00903 | 49.75 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.22 | 0.6358 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.19936 | 0.12187 | 2.67 | 0.1019 | 0.819 |
|  |  |  | Ave Pck-x-Age Squared | 0.00161 | 0.00090 | 3.24 | 0.0719 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 4C. | 5845.55 | 5535.90 | PM10 | 0.13050 | 0.08393 | 2.42 | 0.1200 | 1.139 |
|  |  |  | Average Packs | 5.94112 | 4.62420 | 1.65 | 0.1989 | 380.362 |
|  |  |  | Years Smoked | 0.06368 | 0.00903 | 49.77 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6304 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22369 | 0.13747 | 2.65 | 0.1037 | 0.800 |
|  |  |  | Yrs Smk-x-Age Squared | 0.00272 | 0.00302 | 0.81 | 0.3665 | 1.003 |
|  |  |  | Yrs Smk-x-Age Cubed | -8.91 e-6 | 0.00002 | 0.15 | 0.7014 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Section 5.2: PM2.5–10 (coarse PM)**

**Full Cohort, Based on Pack-Years of Smoking**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,829.1 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21794.68 | PM Coarse | 0.08827 | 0.07113 | 1.54 | 0.2146 | 1.092 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19734.47 | PM Coarse | 0.06232 | 0.07202 | 0.75 | 0.3869 | 1.064 |
|  |  |  | Current v Never | 3.25390 | 0.08446 | 1484.26 | <0.0001 | 25.891 |
|  |  |  | Former v Never | 1.86282 | 0.08076 | 532.026 | <0.0001 | 6.442 |
|  |  |  |  |  |  |  |  |  |
| 3. | 21810.08 | 18721.83 | PM Coarse | 0.02702 | 0.07180 | 0.14 | 0.7067 | 1.027 |
|  |  |  | Current v Never | 1.40526 | 0.10476 | 179.92 | <0.0001 | 4.077 |
|  |  |  | Former v Never | 0.96271 | 0.08773 | 120.41 | <0.0001 | 2.619 |
|  |  |  | Pack-Years | 0.03113 | 0.00092 | 1142.75 | <0.0001 | 1.032 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18550.52 | PM Coarse | 0.02195 | 0.07209 | 0.09 | 0.7608 | 1.022 |
|  |  |  | Current v Never | 0.18414 | 0.14328 | 1.65 | 0.1987 | 1.202 |
|  |  |  | Former v Never | 0.13068 | 0.11341 | 1.33 | 0.2492 | 1.140 |
|  |  |  | Pack-Years | 0.02219 | 0.00114 | 375.43 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03596 | 0.00277 | 168.48 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18545.69 | PM Coarse | 0.02048 | 0.07205 | 0.08 | 0.7762 | 1.021 |
|  |  |  | Current v Never | 0.72037 | 0.24607 | 8.57 | 0.0034 | 2.055 |
|  |  |  | Former v Never | 0.70777 | 0.24417 | 8.40 | 0.0037 | 2.029 |
|  |  |  | Pack-Years | 0.02240 | 0.00115 | 380.04 | <0.0001 | 1.023 |
|  |  |  | Years Smoked | 0.02509 | 0.00490 | 26.19 | <0.0001 | 1.025 |
|  |  |  | Months Quit | -0.00111 | 0.00042 | 7.02 | 0.0081 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 21810.08 | 18550.06 | PM Coarse | 0.02140 | 0.07209 | 0.09 | 0.7666 | 1.022 |
|  |  |  | Pack-Years | 0.02212 | 0.00114 | 377.00 | <0.0001 | 1.022 |
|  |  |  | Years Smoked | 0.03824 | 0.00208 | 337.45 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00006 | 0.00018 | 0.11 | 0.7373 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 21810.08 | 18509.79 | PM Coarse | 0.01561 | 0.07211 | 0.05 | 0.8286 | 1.016 |
|  |  |  | Pack-Years | 0.07575 | 0.00832 | 82.95 | <0.0001 | 1.079 |
|  |  |  | Years Smoked | 0.03853 | 0.00207 | 346.82 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.08 | 0.7796 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00074 | 0.00011 | 41.88 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 21810.08 | 18511.78 | PM Coarse | 0.01566 | 0.07211 | 0.05 | 0.8280 | 1.016 |
|  |  |  | Pack-Years | 0.08009 | 0.06737 | 1.41 | 0.2345 | 1.083 |
|  |  |  | Years Smoked | 0.03852 | 0.00208 | 344.42 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.08 | 0.7782 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00087 | 0.00191 | 0.21 | 0.6486 | 0.999 |
|  |  |  | Pack-Yr-x-Age Squared | 8.76 e-7 | 0.00001 | 0.01 | 0.9481 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 21810.08 | 18513.15 | PM Coarse | 0.01563 | 0.07210 | 0.05 | 0.8284 | 1.016 |
|  |  |  | Pack-Years | -0.29417 | 0.47782 | 0.38 | 0.5381 | 0.745 |
|  |  |  | Years Smoked | 0.03849 | 0.00208 | 343.90 | <0.0001 | 1.039 |
|  |  |  | Months Quit | -0.00005 | 0.00018 | 0.08 | 0.7735 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01547 | 0.02073 | 0.56 | 0.4557 | 1.016 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00023 | 0.00030 | 0.62 | 0.4308 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.12e-6 | 1.42e-6 | 0.63 | 0.4286 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 21810.08 | 18879.23 | PM Coarse | 0.02368 | 0.07168 | 0.11 | 0.7411 | 1.024 |
|  |  |  | Pack-Years | -0.28240 | 0.42969 | 0.43 | 0.5110 | 0.754 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01659 | 0.01862 | 0.79 | 0.3727 | 1.017 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00026 | 0.00027 | 0.98 | 0.3211 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.34e-6 | 1.27e-6 | 1.11 | 0.2912 | 1.000 |

**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up.

**Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1668.18 | PM Coarse | 0.09761 | 0.21155 | 0.21 | 0.6445 | 1.103 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years), Based on Pack-Years of Smoking**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8778.12 | PM Coarse | 0.09265 | 0.07044 | 1.73 | 0.1884 | 1.097 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8382.31 | PM Coarse | 0.13243 | 0.10716 | 1.53 | 0.2165 | 1.142 |
|  |  |  | Former v Never | 1.51637 | 0.08475 | 320.17 | <0.0001 | 4.556 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8778.12 | 7989.03 | PM Coarse | 0.11722 | 0.10807 | 1.18 | 0.2781 | 1.124 |
|  |  |  | Former v Never | 0.61175 | 0.10082 | 36.82 | <0.0001 | 1.844 |
|  |  |  | Pack-Years | 0.03606 | 0.00166 | 472.49 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 7946.07 | PM Coarse | 0.11130 | 0.10844 | 1.05 | 0.3074 | 1.118 |
|  |  |  | Former v Never | 0.08477 | 0.13299 | 0.41 | 0.5238 | 1.088 |
|  |  |  | Pack-Years | 0.02619 | 0.00222 | 138.68 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.03060 | 0.00455 | 45.27 | <0.0001 | 1.031 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8778.12 | 7944.07 | PM Coarse | 0.11097 | 0.10840 | 1.05 | 0.3059 | 1.117 |
|  |  |  | Former v Never | 0.79179 | 0.37037 | 4.57 | 0.0325 | 2.207 |
|  |  |  | Pack-Years | 0.02640 | 0.00223 | 140.12 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.01799 | 0.00764 | 5.55 | 0.0185 | 1.018 |
|  |  |  | Months Quit | -0.00127 | 0.00063 | 4.12 | 0.0423 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8778.12 | 7941.37 | PM Coarse | 0.10475 | 0.10849 | 0.93 | 0.3343 | 1.110 |
|  |  |  | Former v Never | 0.51435 | 0.40058 | 1.65 | 0.1991 | 1.673 |
|  |  |  | Pack-Years | -0.61344 | 1.15146 | 0.28 | 0.5942 | 0.541 |
|  |  |  | Years Smoked | 0.02299 | 0.00807 | 8.12 | 0.0044 | 1.023 |
|  |  |  | Months Quit | -0.00084 | 0.00066 | 1.60 | 0.2059 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02720 | 0.04866 | 0.31 | 0.5762 | 1.028 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00037 | 0.00068 | 0.30 | 0.5856 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.64e-6 | 3.17e-6 | 0.27 | 0.6049 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 7946.47 | PM Coarse | 0.11061 | 0.10847 | 1.04 | 0.3079 | 1.117 |
|  |  |  | Pack-Years | 0.02607 | 0.00222 | 138.01 | <0.0001 | 1.026 |
|  |  |  | Years Smoked | 0.03252 | 0.00352 | 85.20 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00002 | 0.00022 | 0.01 | 0.9221 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 7937.45 | PM Coarse | 0.10399 | 0.10854 | 0.92 | 0.3380 | 1.110 |
|  |  |  | Pack-Years | 0.08519 | 0.01771 | 23.13 | <0.0001 | 1.089 |
|  |  |  | Years Smoked | 0.03223 | 0.00351 | 84.14 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00004 | 0.00022 | 0.03 | 0.8668 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00079 | 0.00024 | 11.19 | 0.0008 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 7939.14 | PM Coarse | 0.10330 | 0.10856 | 0.90 | 0.3413 | 1.109 |
|  |  |  | Pack-Years | -0.00069 | 0.15640 | 0.00 | 0.9965 | 0.999 |
|  |  |  | Years Smoked | 0.03234 | 0.00352 | 84.45 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00004 | 0.00022 | 0.03 | 0.8603 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.00159 | 0.00431 | 0.13 | 0.7127 | 1.002 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00002 | 0.00003 | 0.30 | 0.5802 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 7940.98 | PM Coarse | 0.10381 | 0.10854 | 0.91 | 0.3389 | 1.109 |
|  |  |  | Pack-Years | -0.45672 | 1.13630 | 0.16 | 0.6877 | 0.633 |
|  |  |  | Years Smoked | 0.03232 | 0.00352 | 84.30 | <0.0001 | 1.033 |
|  |  |  | Months Quit | -0.00004 | 0.00022 | 0.03 | 0.8672 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02101 | 0.04810 | 0.19 | 0.6622 | 1.021 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00029 | 0.00067 | 0.18 | 0.6674 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.28e-6 | 3.14e-6 | 0.16 | 0.6845 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8778.12 | 8018.33 | PM Coarse | 0.10689 | 0.10829 | 0.97 | 0.3236 | 1.113 |
|  |  |  | Pack-Years | -0.46678 | 1.06297 | 0.19 | 0.6606 | 0.627 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02355 | 0.04492 | 0.27 | 0.6032 | 1.024 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00034 | 0.00063 | 0.29 | 0.5894 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.58e-6 | 2.93e-6 | 0.29 | 0.5885 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years), Based on Pack-Years of Smoking**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8450.38 | PM Coarse | -0.01705 | 0.09824 | 0.03 | 0.8622 | 0.983 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8397.10 | PM Coarse | -0.01938 | 0.09843 | 0.04 | 0.8439 | 0.981 |
|  |  |  | Current v Former | 0.45282 | 0.06170 | 53.86 | <0.0001 | 1.573 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8051.65 | PM Coarse | -0.03160 | 0.09832 | 0.10 | 0.7479 | 0.969 |
|  |  |  | Current v Former | 0.18767 | 0.06368 | 8.68 | 0.0032 | 1.206 |
|  |  |  | Pack-Years | 0.02383 | 0.00126 | 360.36 | <0.0001 | 1.024 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8025.01 | PM Coarse | -0.03071 | 0.09848 | 0.10 | 0.7551 | 0.970 |
|  |  |  | Current v Former | 0.03226 | 0.07032 | 0.21 | 0.6464 | 1.033 |
|  |  |  | Pack-Years | 0.02088 | 0.00137 | 231.08 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03311 | 0.00652 | 25.81 | <0.0001 | 1.034 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8454.28 | 8026.47 | PM Coarse | -0.03938 | 0.06254 | 0.40 | 0.5289 | 0.961 |
|  |  |  | Current v Former | 0.08738 | 0.10316 | 0.72 | 0.3970 | 1.091 |
|  |  |  | Pack-Years | 0.02085 | 0.00137 | 230.10 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03480 | 0.00695 | 25.08 | <0.0001 | 1.035 |
|  |  |  | Months Quit | 0.00111 | 0.00151 | 0.54 | 0.4611 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8454.28 | 8017.12 | PM Coarse | -0.03781 | 0.09840 | 0.15 | 0.7008 | 0.963 |
|  |  |  | Current v Former | 0.08691 | 0.10306 | 0.71 | 0.3991 | 1.091 |
|  |  |  | Pack-Years | -0.32850 | 0.88518 | 0.14 | 0.7106 | 0.720 |
|  |  |  | Years Smoked | 0.03336 | 0.00691 | 23.32 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00111 | 0.00150 | 0.54 | 0.4593 | 1.001 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01889 | 0.03871 | 0.24 | 0.6256 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00056 | 0.31 | 0.5766 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.63e-6 | 2.69e-6 | 0.37 | 0.5433 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8025.19 | PM Coarse | -0.03055 | 0.09848 | 0.10 | 0.7564 | 0.970 |
|  |  |  | Pack-Years | 0.02090 | 0.00137 | 231.63 | <0.0001 | 1.021 |
|  |  |  | Years Smoked | 0.03506 | 0.00694 | 25.50 | <0.0001 | 1.036 |
|  |  |  | Months Quit | 0.00018 | 0.00104 | 0.03 | 0.8605 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8013.55 | PM Coarse | -0.03754 | 0.09844 | 0.14 | 0.7030 | 0.963 |
|  |  |  | Pack-Years | 0.07235 | 0.01397 | 26.82 | <0.0001 | 1.075 |
|  |  |  | Years Smoked | 0.03401 | 0.00689 | 24.38 | <0.0001 | 1.035 |
|  |  |  | Months Quit | 0.00022 | 0.00103 | 0.04 | 0.8315 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00072 | 0.00020 | 13.67 | 0.0002 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8014.20 | PM Coarse | -0.03611 | 0.09841 | 0.13 | 0.7137 | 0.965 |
|  |  |  | Pack-Years | 0.20556 | 0.11525 | 3.18 | 0.0745 | 1.228 |
|  |  |  | Years Smoked | 0.03366 | 0.00690 | 23.80 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00020 | 0.00103 | 0.04 | 0.8489 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00457 | 0.00331 | 1.91 | 0.1672 | 0.995 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00003 | 0.00002 | 1.35 | 0.2443 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8015.84 | PM Coarse | -0.03702 | 0.09840 | 0.14 | 0.7067 | 0.964 |
|  |  |  | Pack-Years | -0.31725 | 0.88503 | 0.13 | 0.7200 | 0.728 |
|  |  |  | Years Smoked | 0.03363 | 0.00690 | 23.73 | <0.0001 | 1.034 |
|  |  |  | Months Quit | 0.00019 | 0.00103 | 0.03 | 0.8557 | 1.000 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01840 | 0.03870 | 0.23 | 0.6344 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00031 | 0.00056 | 0.30 | 0.5850 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.60e-6 | 2.69e-6 | 0.35 | 0.5514 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8454.28 | 8046.11 | PM Coarse | -0.03747 | 0.09817 | 0.15 | 0.7027 | 0.963 |
|  |  |  | Pack-Years | -0.30888 | 0.86635 | 0.13 | 0.7214 | 0.734 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.01869 | 0.03787 | 0.24 | 0.6216 | 1.019 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00032 | 0.00055 | 0.33 | 0.5634 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.68e-6 | 2.63e-6 | 0.41 | 0.5226 | 1.000 |

**Former Smokers Only (Quit for ≥ 10 Years), Based on Pack-Years of Smoking**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5850.01 | PM Coarse | 0.14353 | 0.12516 | 1.31 | 0.2515 | 1.154 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5459.11 | PM Coarse | 0.12779 | 0.12650 | 1.02 | 0.3124 | 1.136 |
|  |  |  | Pack-Years | 0.03634 | 0.00169 | 461.87 | <0.0001 | 1.037 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5412.71 | PM Coarse | 0.12043 | 0.12711 | 0.90 | 0.3434 | 1.128 |
|  |  |  | Pack-Years | 0.02614 | 0.00224 | 135.83 | <0.0001 | 1.026 |
|  |  |  | Years Smoked | 0.03263 | 0.00470 | 48.27 | <0.0001 | 1.033 |
|  |  |  |  |  |  |  |  |  |
| 4. | 5845.55 | 5413.92 | PM Coarse | 0.11987 | 0.12706 | 0.89 | 0.3455 | 1.127 |
|  |  |  | Pack-Years | 0.02625 | 0.00225 | 136.41 | <0.0001 | 1.027 |
|  |  |  | Years Smoked | 0.02518 | 0.00947 | 7.07 | 0.0079 | 1.025 |
|  |  |  | Months Quit | -0.00069 | 0.00077 | 0.81 | 0.3677 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 5845.55 | 5410.10 | PM Coarse | 0.11246 | 0.12716 | 0.78 | 0.3765 | 1.119 |
|  |  |  | Pack-Years | 0.08034 | 0.02236 | 12.91 | 0.0003 | 1.084 |
|  |  |  | Years Smoked | 0.02385 | 0.00943 | 6.40 | 0.0114 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.99 | 0.3201 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00072 | 0.00030 | 5.88 | 0.0153 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 5845.55 | 5412.02 | PM Coarse | 0.11290 | 0.12715 | 0.79 | 0.3746 | 1.120 |
|  |  |  | Pack-Years | 0.13549 | 0.19857 | 0.46 | 0.4950 | 1.145 |
|  |  |  | Years Smoked | 0.02380 | 0.00943 | 6.37 | 0.0116 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.98 | 0.3208 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | -0.00225 | 0.00546 | 0.17 | 0.6806 | 0.998 |
|  |  |  | Pack-Yr-x-Age Squared | 0.00001 | 0.00004 | 0.08 | 0.7799 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 5C. | 5845.55 | 5413.82 | PM Coarse | 0.11399 | 0.12711 | 0.80 | 0.3698 | 1.121 |
|  |  |  | Pack-Years | -0.48852 | 1.40813 | 0.12 | 0.7286 | 0.614 |
|  |  |  | Years Smoked | 0.02375 | 0.00943 | 6.34 | 0.0118 | 1.024 |
|  |  |  | Months Quit | -0.00076 | 0.00077 | 0.99 | 0.3190 | 0.999 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02430 | 0.05952 | 0.17 | 0.6831 | 1.025 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00036 | 0.00083 | 0.19 | 0.6634 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.74e-6 | 3.88e-6 | 0.20 | 0.6539 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 5845.55 | 5457.22 | PM Coarse | 0.12164 | 0.12658 | 0.92 | 0.3366 | 1.129 |
|  |  |  | Pack-Years | -0.48843 | 1.36111 | 0.13 | 0.7197 | 0.614 |
|  |  |  | Pack-Yr-x-Age (Yrs) | 0.02568 | 0.05750 | 0.20 | 0.6551 | 1.026 |
|  |  |  | Pack-Yr-x-Age Squared | -0.00039 | 0.00080 | 0.24 | 0.6242 | 1.000 |
|  |  |  | Pack-Yr-x-Age Cubed | 1.94e-6 | 3.75e-6 | 0.27 | 0.6048 | 1.000 |

**Full Cohort, Based on Average Packs / Year**

97,303 subjects, 721,127 subject-cycle records, 1,992 events (0.3%), 1,402,829.1 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 21810.08 | 21794.68 | PM Coarse | 0.08827 | 0.07113 | 1.54 | 0.2146 | 1.092 |
|  |  |  |  |  |  |  |  |  |
| 2. | 21810.08 | 19734.47 | PM Coarse | 0.06232 | 0.07202 | 0.75 | 0.3869 | 1.064 |
|  |  |  | Current v Never | 3.25390 | 0.08446 | 1484.26 | <0.0001 | 25.891 |
|  |  |  | Former v Never | 1.86282 | 0.08076 | 532.026 | <0.0001 | 6.442 |
|  |  |  |  |  |  |  |  |  |
| 4. | 21810.08 | 18872.02 | PM Coarse | 0.02690 | 0.07246 | 0.14 | 0.7105 | 1.027 |
|  |  |  | Current v Never | -0.30147 | 0.15980 | 3.56 | 0.0592 | 0.740 |
|  |  |  | Former v Never | -0.38241 | 0.12932 | 8.74 | 0.0031 | 0.682 |
|  |  |  | Average Packs | 1.00707 | 0.13991 | 51.81 | <0.0001 | 2.738 |
|  |  |  | Years Smoked | 0.06870 | 0.00252 | 741.20 | <0.0001 | 1.071 |
|  |  |  |  |  |  |  |  |  |
| 5. | 21810.08 | 18870.21 | PM Coarse | 0.02649 | 0.07243 | 0.13 | 0.7145 | 1.027 |
|  |  |  | Current v Never | 0.08214 | 0.25021 | 0.11 | 0.7427 | 1.086 |
|  |  |  | Former v Never | 0.03302 | 0.24602 | 0.02 | 0.8924 | 1.034 |
|  |  |  | Average Packs | 1.03464 | 0.14025 | 54.42 | <0.0001 | 2.814 |
|  |  |  | Years Smoked | 0.06099 | 0.00461 | 174.94 | <0.0001 | 1.063 |
|  |  |  | Months Quit | -0.00083 | 0.00042 | 3.90 | 0.0484 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 6. | 21810.08 | 18866.84 | PM Coarse | 0.02652 | 0.07243 | 0.13 | 0.7143 | 1.027 |
|  |  |  | Average Packs | 1.06074 | 0.13424 | 62.43 | <0.0001 | 2.889 |
|  |  |  | Years Smoked | 0.06212 | 0.00153 | 1637.65 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00085 | 0.00020 | 17.26 | <0.0001 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 21810.08 | 18868.49 | PM Coarse | 0.02636 | 0.07243 | 0.13 | 0.7160 | 1.027 |
|  |  |  | Average Packs | 0.45426 | 1.02983 | 0.19 | 0.6591 | 1.575 |
|  |  |  | Years Smoked | 0.06208 | 0.00154 | 1632.93 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.58 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00894 | 0.01495 | 0.36 | 0.5499 | 1.009 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 21810.08 | 18869.17 | PM Coarse | 0.02685 | 0.07244 | 0.14 | 0.7312 | 1.016 |
|  |  |  | Average Packs | 3.24429 | 2.63097 | 1.52 | 0.6320 | 5.016 |
|  |  |  | Years Smoked | 0.06206 | 0.00154 | 1631.52 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.67 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.07693 | 0.07623 | 1.02 | 0.2110 | 0.903 |
|  |  |  | Ave Pck-x-Age Squared | 0.00065 | 0.00057 | 1.32 | 0.2577 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 21810.08 | 18870.40 | PM Coarse | 0.02685 | 0.07243 | 0.14 | 0.7108 | 1.027 |
|  |  |  | Average Packs | 1.61525 | 3.36712 | 0.23 | 0.6314 | 5.029 |
|  |  |  | Years Smoked | 0.06206 | 0.00154 | 1630.84 | <0.0001 | 1.064 |
|  |  |  | Months Quit | -0.00086 | 0.00020 | 17.69 | <0.0001 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.10254 | 0.08199 | 1.56 | 0.2111 | 0.903 |
|  |  |  | Ave Pck-x-Age Squared | 0.00246 | 0.00217 | 1.28 | 0.2581 | 1.002 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00001 | 0.00002 | 0.73 | 0.3936 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 21810.08 | 18886.15 | PM Coarse | 0.02982 | 0.07245 | 0.17 | 0.6807 | 1.030 |
|  |  |  | Average Packs | 1.35548 | 3.57448 | 0.14 | 0.7045 | 3.879 |
|  |  |  | Years Smoked | 0.06552 | 0.00139 | 2215.27 | <0.0001 | 1.068 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.10247 | 0.08132 | 1.59 | 0.2076 | 0.903 |
|  |  |  | Ave Pck-x-Age Squared | 0.00254 | 0.00231 | 1.20 | 0.2726 | 1.003 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.71 | 0.3992 | 1.000 |

**Never Smokers**

44,245 subjects, 337,374 subject-cycle records, 179 events (0.1%), 659,099.5 person-years of follow-up.

**Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 1667.02 | 1668.18 | PM Coarse | 0.09761 | 0.21155 | 0.21 | 0.6445 | 1.103 |
|  |  |  |  |  |  |  |  |  |

**Never or Former Smokers (Quit for ≥ 10 Years), Based on Average Packs / Year**

83,819 subjects, 596,454 subject-cycle records, 833 events (0.1%), 1,161,499.3 person-years of follow-up (records with unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8778.12 | 8778.12 | PM Coarse | 0.09265 | 0.07044 | 1.73 | 0.1884 | 1.097 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8778.12 | 8382.31 | PM Coarse | 0.13243 | 0.10716 | 1.53 | 0.2165 | 1.142 |
|  |  |  | Former v Never | 1.51637 | 0.08475 | 320.17 | <0.0001 | 4.556 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8778.12 | 8068.82 | PM Coarse | 0.11376 | 0.10866 | 1.10 | 0.2951 | 1.120 |
|  |  |  | Former v Never | -0.26170 | 0.16190 | 2.61 | 0.1060 | 0.770 |
|  |  |  | Average Packs | 0.61665 | 0.19822 | 9.68 | 0.0019 | 1.853 |
|  |  |  | Years Smoked | 0.06497 | 0.00399 | 265.20 | <0.0001 | 1.067 |
|  |  |  |  |  |  |  |  |  |
| 5A. | 8778.12 | 8067.99 | PM Coarse | 0.11394 | 0.10865 | 1.10 | 0.2943 | 1.121 |
|  |  |  | Former v Never | 0.32070 | 0.37670 | 0.72 | 0.3946 | 1.378 |
|  |  |  | Average Packs | 0.62897 | 0.19848 | 10.04 | 0.0015 | 1.876 |
|  |  |  | Years Smoked | 0.05480 | 0.00713 | 59.13 | <0.0001 | 1.056 |
|  |  |  | Months Quit | -0.00106 | 0.00062 | 2.90 | 0.0887 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 5B. | 8778.12 | 8070.90 | PM Coarse | 0.11511 | 0.10872 | 1.12 | 0.2897 | 1.122 |
|  |  |  | Former v Never | 0.35402 | 0.37998 | 0.87 | 0.3515 | 1.425 |
|  |  |  | Average Packs | 4.95195 | 4.58290 | 1.17 | 0.2799 | 141.451 |
|  |  |  | Years Smoked | 0.05414 | 0.00718 | 56.83 | <0.0001 | 1.056 |
|  |  |  | Months Quit | -0.00113 | 0.00063 | 3.17 | 0.0749 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22935 | 0.13676 | 2.81 | 0.0935 | 0.795 |
|  |  |  | Ave Pck-x-Age Squared | 0.00374 | 0.00299 | 1.56 | 0.2114 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.68 | 0.4095 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8778.12 | 8066.71 | PM Coarse | 0.11373 | 0.10867 | 1.09 | 0.2953 | 1.120 |
|  |  |  | Average Packs | 0.66504 | 0.19155 | 12.05 | 0.0005 | 1.945 |
|  |  |  | Years Smoked | 0.06057 | 0.00231 | 688.44 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00058 | 0.00027 | 4.67 | 0.0307 | 0.999 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8778.12 | 8068.69 | PM Coarse | 0.11375 | 0.10867 | 1.09 | 0.2952 | 1.120 |
|  |  |  | Average Packs | 0.49339 | 1.36224 | 0.13 | 0.7172 | 1.638 |
|  |  |  | Years Smoked | 0.06055 | 0.00231 | 688.54 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00059 | 0.00027 | 4.66 | 0.0309 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.00251 | 0.01966 | 0.02 | 0.8985 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8778.12 | 8068.49 | PM Coarse | 0.11448 | 0.10874 | 1.11 | 0.2924 | 1.121 |
|  |  |  | Average Packs | 6.27728 | 4.06998 | 2.38 | 0.1230 | 532.337 |
|  |  |  | Years Smoked | 0.06051 | 0.00231 | 687.21 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00059 | 0.00027 | 4.70 | 0.0301 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.17374 | 0.11934 | 2.11 | 0.1455 | 0.841 |
|  |  |  | Ave Pck-x-Age Squared | 0.00132 | 0.00088 | 2.24 | 0.1348 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8778.12 | 8069.76 | PM Coarse | 0.11486 | 0.10874 | 1.11 | 0.2908 | 1.122 |
|  |  |  | Average Packs | 5.11978 | 4.53155 | 1.28 | 0.2568 | 167.298 |
|  |  |  | Years Smoked | 0.06049 | 0.00231 | 686.26 | <0.0001 | 1.062 |
|  |  |  | Months Quit | -0.00059 | 0.00027 | 4.78 | 0.0287 | 0.999 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22952 | 0.13701 | 2.81 | 0.0939 | 0.795 |
|  |  |  | Ave Pck-x-Age Squared | 0.00371 | 0.00297 | 1.56 | 0.2119 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.69 | 0.4061 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 8. | 8778.12 | 8072.60 | PM Coarse | 0.11541 | 0.10867 | 1.13 | 0.2882 | 1.122 |
|  |  |  | Average Packs | 5.04183 | 4.67167 | 1.16 | 0.2805 | 154.753 |
|  |  |  | Years Smoked | 0.05966 | 0.00232 | 663.27 | <0.0001 | 1.061 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22801 | 0.13570 | 2.82 | 0.0929 | 0.796 |
|  |  |  | Ave Pck-x-Age Squared | 0.00365 | 0.00307 | 1.41 | 0.2345 | 1.004 |
|  |  |  | Ave Pck-x-Age Cubed | -0.00002 | 0.00002 | 0.61 | 0.4332 | 1.000 |

**Current or Former Smokers (Quit for < 10 Years), Based on Average Packs / Year**

25,767 subjects, 124,673 subject-cycle records, 1,159 events (0.9%), 241,329.8 person-years of follow-up (records with unknown pack-years, unknown years of smoking, or unknown time since quitting deleted).

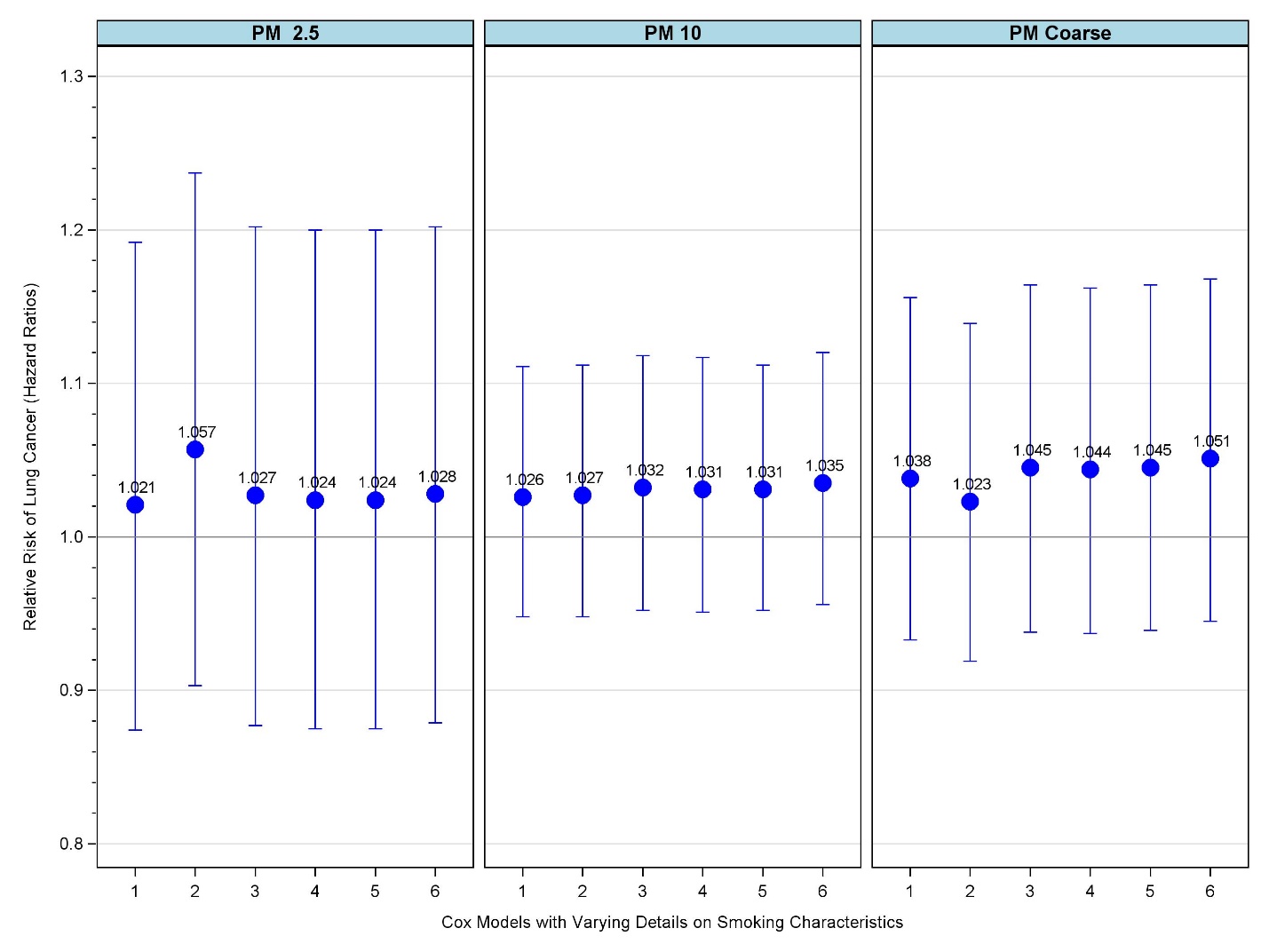
**Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 8454.28 | 8450.38 | PM Coarse | -0.01705 | 0.09824 | 0.03 | 0.8622 | 0.983 |
|  |  |  |  |  |  |  |  |  |
| 2. | 8454.28 | 8397.10 | PM Coarse | -0.01938 | 0.09843 | 0.04 | 0.8439 | 0.981 |
|  |  |  | Current v Former | 0.45282 | 0.06170 | 53.86 | <0.0001 | 1.573 |
|  |  |  |  |  |  |  |  |  |
| 3. | 8454.28 | 8151.32 | PM10 | -0.03108 | 0.09881 | 0.10 | 0.7531 | 0.969 |
|  |  |  | Current v Former | -0.04014 | 0.07056 | 0.32 | 0.5694 | 0.961 |
|  |  |  | Average Packs | 3.62811 | 0.28171 | 165.86 | <0.0001 | 37.642 |
|  |  |  | Years Smoked | 0.08462 | 0.00652 | 168.25 | <0.0001 | 1.088 |
|  |  |  |  |  |  |  |  |  |
| 4. | 8454.28 | 8149.64 | PM Coarse | -0.03118 | 0.09882 | 0.10 | 0.7524 | 0.969 |
|  |  |  | Average Packs | 3.57939 | 0.26773 | 178.74 | <0.0001 | 35.852 |
|  |  |  | Years Smoked | 0.08285 | 0.00570 | 211.03 | <0.0001 | 1.086 |
|  |  |  |  |  |  |  |  |  |
| 5. | 8454.28 | 8149.39 | PM Coarse | -0.03339 | 0.09881 | 0.11 | 0.7345 | 0.967 |
|  |  |  | Current v Former | 0.10327 | 0.10280 | 1.01 | 0.3151 | 1.109 |
|  |  |  | Average Packs | 3.74413 | 0.29044 | 166.18 | <0.0001 | 42.272 |
|  |  |  | Years Smoked | 0.08964 | 0.00713 | 157.94 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00301 | 0.00152 | 3.93 | 0.0474 | 1.003 |
|  |  |  |  |  |  |  |  |  |
| 6. | 8454.28 | 8148.41 | PM Coarse | -0.03245 | 0.09880 | 0.11 | 0.7426 | 0.968 |
|  |  |  | Average Packs | 3.76432 | 0.28984 | 168.68 | <0.0001 | 43.134 |
|  |  |  | Years Smoked | 0.09009 | 0.00712 | 160.07 | <0.0001 | 1.094 |
|  |  |  | Months Quit | 0.00192 | 0.00106 | 3.25 | 0.0713 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 7A. | 8454.28 | 8150.26 | PM Coarse | -0.03379 | 0.09899 | 0.12 | 0.7326 | 0.967 |
|  |  |  | Average Packs | 2.74744 | 2.58385 | 1.13 | 0.2876 | 15.603 |
|  |  |  | Years Smoked | 0.09031 | 0.00715 | 159.67 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00194 | 0.00106 | 3.32 | 0.0685 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01504 | 0.03790 | 0.16 | 0.6915 | 1.015 |
|  |  |  |  |  |  |  |  |  |
| 7B. | 8454.28 | 8151.67 | PM Coarse | -0.03274 | 0.09891 | 0.11 | 0.7406 | 0.968 |
|  |  |  | Average Packs | 4.83983 | 3.76259 | 1.65 | 0.1983 | 126.448 |
|  |  |  | Years Smoked | 0.09048 | 0.00716 | 159.83 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00197 | 0.00106 | 3.41 | 0.0646 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.05796 | 0.10258 | 0.32 | 0.5721 | 0.944 |
|  |  |  | Ave Pck-x-Age Squared | 0.00062 | 0.00080 | 0.59 | 0.4434 | 1.001 |
|  |  |  |  |  |  |  |  |  |
| 7C. | 8454.28 | 8152.11 | PM Coarse | -0.03240 | 0.09898 | 0.11 | 0.7434 | 0.968 |
|  |  |  | Average Packs | 15.46753 | 9.12692 | 2.87 | 0.0901 | >999 |
|  |  |  | Years Smoked | 0.09048 | 0.00714 | 160.71 | <0.0001 | 1.095 |
|  |  |  | Months Quit | 0.00194 | 0.00106 | 3.33 | 0.0679 | 1.002 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.04262 | 0.10330 | 0.17 | 0.6799 | 0.958 |
|  |  |  | Ave Pck-x-Age Squared | -0.00684 | 0.00591 | 1.34 | 0.2472 | 0.993 |
|  |  |  | Ave Pck-x-Age Cubed | 0.00007 | 0.00006 | 1.62 | 0.2024 | 1.000 |
|  |  |  |  |  |  |  |  |  |

**Former Smokers Only (Quit for ≥ 10 Years), Based on Average Packs / Year**

39,575 subjects, 259,080 subject-cycle records, 654 events (0.3%), 502,399.8 person-years of follow-up (records with unknown time since quitting deleted). **Each model includes stratification by age-month and cycle, also with region as a covariate.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **AIC w/o Cov.** | **AIC w/ Cov.** | **Covariates** | **Est.** | **Std. Err.** | **Χ2** | **P(Χ2)** | **HR** |
| 1. | 5845.55 | 5850.01 | PM Coarse | 0.14353 | 0.12516 | 1.31 | 0.2515 | 1.154 |
|  |  |  |  |  |  |  |  |  |
| 2. | 5845.55 | 5533.49 | PM Coarse | 0.12469 | 0.12765 | 0.95 | 0.3287 | 1.133 |
|  |  |  | Average Packs | 0.61355 | 0.19991 | 9.42 | 0.0021 | 1.847 |
|  |  |  | Years Smoked | 0.06723 | 0.00415 | 261.91 | <0.0001 | 1.070 |
|  |  |  |  |  |  |  |  |  |
| 3. | 5845.55 | 5535.25 | PM Coarse | 0.12458 | 0.12764 | 0.95 | 0.3291 | 1.133 |
|  |  |  | Average Packs | 0.61795 | 0.19998 | 9.55 | 0.0020 | 1.855 |
|  |  |  | Years Smoked | 0.06328 | 0.00903 | 49.11 | <0.0001 | 1.065 |
|  |  |  | Months Quit | -0.00038 | 0.00077 | 0.24 | 0.6234 | 1.000 |
|  |  |  |  |  |  |  |  |  |
| 4A. | 5845.55 | 5536.69 | PM Coarse | 0.12475 | 0.12763 | 0.95 | 0.3284 | 1.133 |
|  |  |  | Average Packs | -0.52246 | 1.56565 | 0.11 | 0.7386 | 0.593 |
|  |  |  | Years Smoked | 0.06367 | 0.00903 | 49.71 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00038 | 0.00077 | 0.24 | 0.6225 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | 0.01648 | 0.02220 | 0.55 | 0.4580 | 1.017 |
|  |  |  |  |  |  |  |  |  |
| 4B. | 5845.55 | 5535.49 | PM Coarse | 0.12541 | 0.12781 | 0.96 | 0.3265 | 1.134 |
|  |  |  | Average Packs | 6.60739 | 4.20433 | 2.47 | 0.1161 | 740.551 |
|  |  |  | Years Smoked | 0.06367 | 0.00903 | 49.73 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.23 | 0.6305 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.20036 | 0.12191 | 2.70 | 0.1003 | 0.818 |
|  |  |  | Ave Pck-x-Age Squared | 0.00162 | 0.00090 | 3.26 | 0.0709 | 1.002 |
|  |  |  |  |  |  |  |  |  |
| 4C. | 5845.55 | 5537.34 | PM Coarse | 0.12570 | 0.12781 | 0.97 | 0.3254 | 1.134 |
|  |  |  | Average Packs | 5.99017 | 4.62251 | 1.68 | 0.1950 | 399.484 |
|  |  |  | Years Smoked | 0.06366 | 0.00903 | 49.75 | <0.0001 | 1.066 |
|  |  |  | Months Quit | -0.00037 | 0.00077 | 0.24 | 0.6254 | 1.000 |
|  |  |  | Ave Pck-x-Age (Yrs) | -0.22421 | 0.13746 | 2.66 | 0.1029 | 0.799 |
|  |  |  | Yrs Smk-x-Age Squared | 0.00271 | 0.00302 | 0.81 | 0.3689 | 1.003 |
|  |  |  | Yrs Smk-x-Age Cubed | -8.74 e-6 | 0.00002 | 0.14 | 0.7068 | 1.000 |
|  |  |  |  |  |  |  |  |  |



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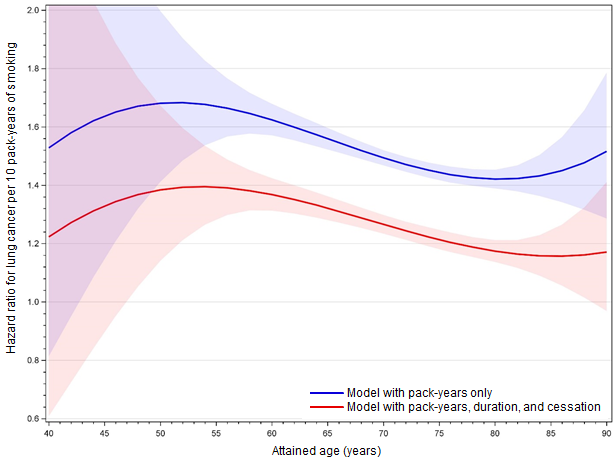
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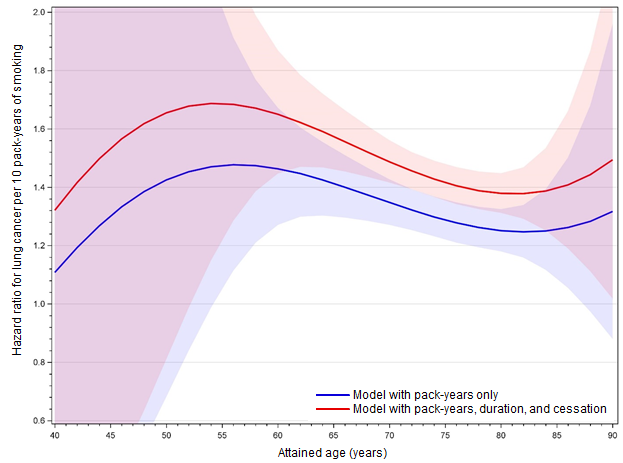
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**Figures 1A–C. Age-related modification of cumulative pack-years in (A) the full cohort, (B) former smokers, and (C) current smokers, using fully adjusted models. Lines illustrate the hazard ratio per 10 pack-years of smoking, and shading illustrates 95% confidence intervals around the hazard ratio. Red denotes models including PM2.5 and cumulative pack-years only (with age interactions), and blue denotes models including PM2.5, cumulative pack-years (with age interactions), years of smoking, and months since cessation.**

A. 

B.



C.

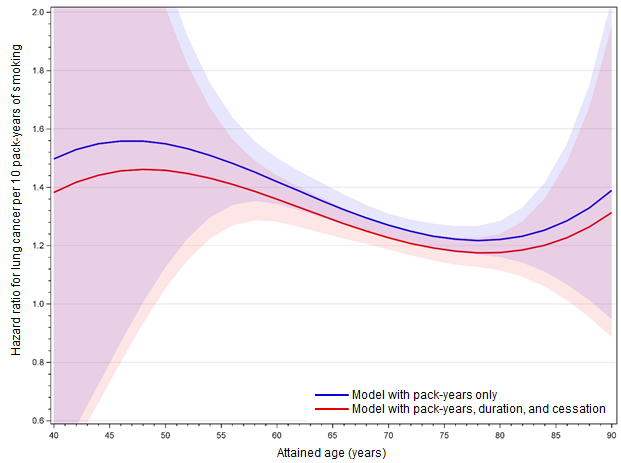


Table 1. Smoking and air pollution characteristics of the Nurses’ Health Study cohort at study baseline (1994) and during follow-up (1994–2010), stratified by smoking status at study baseline.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Never smokers | | Former smokers | | Current smokers | | Total cohort\* | |
|  |  | n = 44,245 | | n = 39,061 | | n = 12,784 | | n = 96,090 | |
|  |  | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Age at baseline (years) | | 60.5 | 7.3 | 60.7 | 7.0 | 59.7 | 6.9 | 60.5 | 7.1 |
| … during follow-up | | 67.1 | 7.2 | 67.2 | 6.8 | 65.6 | 6.6 | 67.0 | 7.0 |
| Smoking duration at baseline (years) | | - | - | 21.0 | 12.8 | 39.0 | 8.5 | - | - |
| … during follow-up | | 0.0 | 0.1 | 21.4 | 13.0 | 43.5 | 8.7 | - | - |
| Cumulative smoking at baseline (pack-years) | | - | - | 18.8 | 17.6 | 42.2 | 20.6 | - | - |
| … during follow-up | | 0.0 | 0.0 | 19.1 | 17.8 | 46.0 | 21.9 | - | - |
| Average packs at baseline (pack-years / duration) | | - | - | 0.3 | 0.3 | 0.1 | 0.1 | - | - |
| … during follow-up | | 0.0 | 0.0 | 0.3 | 0.3 | 0.1 | 0.1 | - | - |
| Age at smoking initiation (years) | | - | - | 19.3 | 4.2 | 19.1 | 4.0 | - | - |
| Age at smoking cessation (years) | | - | - | 41.7 | 13.1 | - | - | - | - |
| Time since smoking cessation at baseline (months) | | - | - | 228.7 | 143.2 | - | - | - | - |
| PM2.5 at baseline (µg/m3) | | 15.2 | 3.3 | 15.0 | 3.2 | 15.2 | 3.1 | 15.1 | 3.2 |
| … during follow-up | | 13.2 | 2.8 | 13.0 | 2.7 | 13.4 | 2.7 | 13.2 | 2.7 |
| PM10 at baseline (µg/m3) | | 25.8 | 6.8 | 25.3 | 6.3 | 25.3 | 6.2 | 25.5 | 6.5 |
| … during follow-up | | 21.9 | 5.6 | 21.5 | 5.3 | 21.8 | 5.3 | 21.7 | 5.4 |
| PM2.5–10 at baseline (µg/m3) | | 10.6 | 5.0 | 10.3 | 4.6 | 10.1 | 4.5 | 10.4 | 4.7 |
| … during follow-up | | 8.6 | 4.1 | 8.5 | 3.8 | 8.5 | 3.8 | 8.5 | 4.0 |
|  |  | n | % | n | % | n | % | n | % |
| Geographic region at baseline | |  |  |  |  |  |  |  |  |
|  | Northeast | 21,695 | 49% | 21,204 | 54% | 7,224 | 57% | 50,123 | 52% |
|  | Midwest | 8,779 | 20% | 6,257 | 16% | 2,178 | 17% | 17,214 | 18% |
|  | West | 6,254 | 14% | 5,110 | 13% | 1,288 | 10% | 12,652 | 13% |
|  | South | 7,517 | 17% | 6,490 | 17% | 2,094 | 16% | 16,101 | 17% |
| \*The total eligible cohort of 97,303 women is larger than the cohort of 96,090 with known smoking status at baseline in 1994, due to the availability of smoking data from an additional 1,213 women during follow-up. | | | | | | | | | |
| PM: particulate matter | |  |  |  |  |  |  |  |  |
| SD: standard deviation | |  |  |  |  |  |  |  |  |

Table 2. Model fit and associations between fine particulate matter and smoking characteristics with lung cancer incidence in the Nurses’ Health Study, adjusted for age, time period, and geographic region only (minimally adjusted models) or additional covariates (fully adjusted models), with various classifications of smoking based on cumulative pack-years.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Minimally adjusteda** | | | | **Fully adjustedb** | | | |
| **AIC, minimally adj.** | **AIC, fully adj.** | **Covariate** | **HR** | **95% CI** | | | **HR** | **95% CI** | | |
| 21,796.11 | 21,096.64 | PM2.5 (per 10 µg/m3) | 1.02 | 0.87 | – | 1.21 | 1.07 | 0.90 | – | 1.26 |
| 19,734.78 | 19,610.10 | PM2.5 (per 10 µg/m3) | 1.06 | 0.90 | – | 1.24 | 1.06 | 0.90 | – | 1.25 |
|  |  | Current v. never smoker | 25.85 | 21.91 | – | 30.51 | 19.25 | 16.18 | – | 22.91 |
|  |  | Former v. never smoker | 6.45 | 5.50 | – | 7.55 | 5.80 | 4.93 | – | 6.82 |
| 18,721.24 | 18,705.14 | PM2.5 (per 10 µg/m3) | 1.07 | 0.91 | – | 1.27 | 1.09 | 0.92 | – | 1.28 |
|  |  | Current v. never smoker | 4.08 | 3.32 | – | 5.01 | 3.65 | 2.96 | – | 4.50 |
|  |  | Former v. never smoker | 2.62 | 2.21 | – | 3.11 | 2.52 | 2.11 | – | 3.00 |
|  |  | Smoking pack-years | 1.03 | 1.03 | – | 1.03 | 1.03 | 1.03 | – | 1.03 |
| 18,550.32 | 18,549.61 | PM2.5 (per 10 µg/m3) | 1.05 | 0.89 | – | 1.23 | 1.06 | 0.89 | – | 1.25 |
|  |  | Current v. never smoker | 1.20 | 0.91 | – | 1.59 | 1.14 | 0.86 | – | 1.51 |
|  |  | Former v. never smoker | 1.14 | 0.91 | – | 1.43 | 1.12 | 0.90 | – | 1.41 |
|  |  | Smoking pack-years | 1.02 | 1.02 | – | 1.02 | 1.02 | 1.02 | – | 1.02 |
|  |  | Smoking duration (years) | 1.04 | 1.03 | – | 1.04 | 1.04 | 1.03 | – | 1.04 |
| 18,545.49 | 18,545.16 | PM2.5 (per 10 µg/m3) | 1.05 | 0.89 | – | 1.23 | 1.06 | 0.89 | – | 1.25 |
|  |  | Current v. never smoker | 2.06 | 1.27 | – | 3.33 | 1.92 | 1.18 | – | 3.12 |
|  |  | Former v. never smoker | 2.03 | 1.26 | – | 3.28 | 1.97 | 1.22 | – | 3.19 |
|  |  | Smoking pack-years | 1.02 | 1.02 | – | 1.02 | 1.02 | 1.02 | – | 1.02 |
|  |  | Smoking duration (years) | 1.03 | 1.02 | – | 1.04 | 1.02 | 1.01 | – | 1.03 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,549.88 | 18,548.57 | PM2.5 (per 10 µg/m3) | 1.04 | 0.89 | – | 1.23 | 1.05 | 0.89 | – | 1.25 |
|  |  | Smoking pack-years | 1.02 | 1.02 | – | 1.02 | 1.02 | 1.02 | – | 1.02 |
|  |  | Smoking duration (years) | 1.04 | 1.03 | – | 1.04 | 1.04 | 1.03 | – | 1.04 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,509.50 | 18,491.76 | PM2.5 (per 10 µg/m3) | 1.05 | 0.89 | – | 1.24 | 1.06 | 0.90 | – | 1.25 |
|  |  | Smoking pack-years | 1.08 | 1.06 | – | 1.10 | 1.08 | 1.06 | – | 1.09 |
|  |  | Smoking duration (years) | 1.04 | 1.04 | – | 1.04 | 1.04 | 1.03 | – | 1.04 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Pack-years\*age | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,511.49 | 18,493.76 | PM2.5 (per 10 µg/m3) | 1.05 | 0.89 | – | 1.24 | 1.06 | 0.90 | – | 1.25 |
|  |  | Smoking pack-years | 1.08 | 0.95 | – | 1.24 | 1.08 | 0.94 | – | 1.23 |
|  |  | Smoking duration (years) | 1.04 | 1.04 | – | 1.04 | 1.04 | 1.03 | – | 1.04 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Pack-years\*age | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Pack-years\*age squared | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,512.86 | 18,495.19 | PM2.5 (per 10 µg/m3) | 1.05 | 0.89 | – | 1.24 | 1.06 | 0.90 | – | 1.25 |
|  |  | Smoking pack-years | 0.74 | 0.29 | – | 1.90 | 0.75 | 0.29 | – | 1.92 |
|  |  | Smoking duration (years) | 1.04 | 1.04 | – | 1.04 | 1.04 | 1.03 | – | 1.04 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Pack-years\*age | 1.02 | 0.98 | – | 1.06 | 1.02 | 0.97 | – | 1.06 |
|  |  | Pack-years\*age squared | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Pack-years\*age cubed | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,878.51 | 18,810.61 | PM2.5 (per 10 µg/m3) | 1.08 | 0.92 | – | 1.27 | 1.10 | 0.93 | – | 1.30 |
|  |  | Smoking pack-years | 0.75 | 0.32 | – | 1.74 | 0.77 | 0.33 | – | 1.80 |
|  |  | Pack-years\*age | 1.02 | 0.98 | – | 1.05 | 1.02 | 0.98 | – | 1.05 |
|  |  | Pack-years\*age squared | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Pack-years\*age cubed | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| aStratified by time period and age in months (in absence of age interaction), and adjusted for geographic region; also adjusted for age in months (in presence of age interaction) | | | | | | | | | | |
| bStratified by time period and age in months (in absence of age interaction), and adjusted for geographic region, body mass index, alcohol consumption, physical activity, overall diet quality, census tract median house value, census tract median income, and secondhand smoke exposure at home, at work, and during childhood; also adjusted for age in months (in presence of age interaction) | | | | | | | | | | |
| AIC: Akaike information criterion; CI: confidence interval; HR: hazard ratio; PM2.5: particulate matter < 2.5 µm in aerodynamic diameter | | | | | | | | | | |

Table 3. Model fit and associations between fine particulate matter and smoking characteristics with lung cancer incidence in the Nurses’ Health Study, adjusted for age, time period, and geographic region only (minimally adjusted models) or additional covariates (fully adjusted models), with various classifications of smoking based on average packs.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Minimally adjusteda** | | | | **Fully adjustedb** | | | |
| **AIC, minimally adj.** | **AIC, fully adj.** | **Covariate** | **HR** | **95% CI** | | | **HR** | **95% CI** | | |
| 21,796.11 | 21,096.64 | PM2.5 (per 10 µg/m3) | 1.02 | 0.87 | – | 1.21 | 1.07 | 0.90 | – | 1.26 |
| 19,734.78 | 19,610.10 | PM2.5 (per 10 µg/m3) | 1.06 | 0.90 | – | 1.24 | 1.06 | 0.90 | – | 1.25 |
|  |  | Current v. never smoker | 25.91 | 21.96 | – | 30.57 | 19.25 | 16.18 | – | 22.91 |
|  |  | Former v. never smoker | 6.45 | 5.50 | – | 7.55 | 5.80 | 4.93 | – | 6.82 |
| 18,872.12 | 18,859.40 | PM2.5 (per 10 µg/m3) | 1.02 | 0.86 | – | 1.20 | 1.02 | 0.87 | – | 1.21 |
|  |  | Current v. never smoker | 0.74 | 0.54 | – | 1.01 | 0.70 | 0.51 | – | 0.97 |
|  |  | Former v. never smoker | 0.68 | 0.53 | – | 0.88 | 0.68 | 0.52 | – | 0.87 |
|  |  | Smoking average packs | 2.74 | 2.08 | – | 3.60 | 2.75 | 2.08 | – | 3.63 |
|  |  | Smoking duration (years) | 1.07 | 1.07 | – | 1.08 | 1.07 | 1.06 | – | 1.07 |
| 18,870.31 | 18,858.02 | PM2.5 (per 10 µg/m3) | 1.01 | 0.86 | – | 1.19 | 1.02 | 0.87 | – | 1.20 |
|  |  | Current v. never smoker | 1.09 | 0.66 | – | 1.77 | 1.01 | 0.62 | – | 1.66 |
|  |  | Former v. never smoker | 1.03 | 0.64 | – | 1.67 | 1.00 | 0.61 | – | 1.62 |
|  |  | Smoking average packs | 2.81 | 2.14 | – | 3.70 | 2.82 | 2.14 | – | 3.73 |
|  |  | Smoking duration (years) | 1.06 | 1.05 | – | 1.07 | 1.06 | 1.05 | – | 1.07 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,866.94 | 18,854.06 | PM2.5 (per 10 µg/m3) | 1.01 | 0.86 | – | 1.20 | 1.02 | 0.87 | – | 1.20 |
|  |  | Smoking average packs | 2.89 | 2.22 | – | 3.76 | 2.84 | 2.17 | – | 3.71 |
|  |  | Smoking duration (years) | 1.06 | 1.06 | – | 1.07 | 1.06 | 1.06 | – | 1.06 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,868.59 | 18,855.84 | PM2.5 (per 10 µg/m3) | 1.02 | 0.86 | – | 1.20 | 1.02 | 0.87 | – | 1.20 |
|  |  | Smoking average packs | 1.57 | 0.21 | – | 11.83 | 1.74 | 0.22 | – | 13.53 |
|  |  | Smoking duration (years) | 1.06 | 1.06 | – | 1.07 | 1.06 | 1.06 | – | 1.06 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Ave. packs\*age | 1.01 | 0.98 | – | 1.04 | 1.01 | 0.98 | – | 1.04 |
| 18,869.28 | 18,856.40 | PM2.5 (per 10 µg/m3) | 1.02 | 0.86 | – | 1.20 | 1.02 | 0.87 | – | 1.21 |
|  |  | Smoking average packs | 25.51 | 0.15 | – | 4427 | 32.35 | 0.18 | – | 5710 |
|  |  | Smoking duration (years) | 1.06 | 1.06 | – | 1.07 | 1.06 | 1.06 | – | 1.06 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Ave. packs\*age | 0.93 | 0.80 | – | 1.08 | 0.92 | 0.79 | – | 1.07 |
|  |  | Ave. packs\*age squared | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| 18,870.50 | 18,857.65 | PM2.5 (per 10 µg/m3) | 1.02 | 0.86 | – | 1.20 | 1.02 | 0.87 | – | 1.21 |
|  |  | Smoking average packs | 4.99 | 0.01 | – | 3670 | 6.21 | 0.01 | – | 4969 |
|  |  | Smoking duration (years) | 1.06 | 1.06 | – | 1.07 | 1.06 | 1.06 | – | 1.06 |
|  |  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  |  | Ave. packs\*age | 0.90 | 0.77 | – | 1.06 | 0.90 | 0.76 | – | 1.05 |
|  |  | Ave. packs\*age squared | 1.00 | 1.00 | – | 1.01 | 1.00 | 1.00 | – | 1.01 |
|  |  | Ave. packs\*age cubed | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| aStratified by time period and age in months (in absence of age interaction), and adjusted for geographic region; also adjusted for age in months (in presence of age interaction) | | | | | | | | | | |
| bStratified by time period and age in months (in absence of age interaction), and adjusted for geographic region, body mass index, alcohol consumption, physical activity, overall diet quality, census tract median house value, census tract median income, and secondhand smoke exposure at home, at work, and during childhood; also adjusted for age in months (in presence of age interaction) | | | | | | | | | | |
| AIC: Akaike information criterion; CI: confidence interval; HR: hazard ratio; PM2.5: particulate matter < 2.5 µm in aerodynamic diameter | | | | | | | | | | |

Table 4. Stratified associations between fine particulate matter and smoking characteristics with lung cancer incidence in the Nurses’ Health Study, adjusted for age, time period, and geographic region only (minimally adjusted models) or additional covariates (fully adjusted models), with various classifications of smoking based on cumulative pack-years or average packs, stratified by smoking status during follow-up, 1994–2010.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Minimally adjusteda** | | | | **Fully adjustedb** | | | |
| **Stratum** | **Covariate** | **HR** | **95% CI** | | | **HR** | **95% CI** | | |
| Never smokers | PM2.5 (per 10 µg/m3) | 1.24 | 0.74 | – | 2.06 | 1.27 | 0.76 | – | 2.12 |
| Former smokers | PM2.5 (per 10 µg/m3) | 1.35 | 1.00 | – | 1.81 | 1.35 | 1.00 | – | 1.82 |
|  | Smoking pack-years | 1.08 | 1.04 | – | 1.13 | 1.09 | 1.04 | – | 1.13 |
|  | Smoking duration (years) | 1.02 | 1.01 | – | 1.04 | 1.02 | 1.00 | – | 1.04 |
|  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  | Pack-years\*age | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  | PM2.5 (per 10 µg/m3) | 1.27 | 0.95 | – | 1.71 | 1.27 | 0.95 | – | 1.71 |
|  | Smoking average packs | 1.85 | 1.25 | – | 2.74 | 1.92 | 1.29 | – | 2.85 |
|  | Smoking duration (years) | 1.07 | 1.05 | – | 1.08 | 1.06 | 1.04 | – | 1.08 |
|  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| Current or recent former smokers | PM2.5 (per 10 µg/m3) | 0.92 | 0.74 | – | 1.15 | 0.94 | 0.75 | – | 1.17 |
| Smoking pack-years | 1.07 | 1.05 | – | 1.10 | 1.07 | 1.04 | – | 1.10 |
|  | Smoking duration (years) | 1.03 | 1.02 | – | 1.05 | 1.03 | 1.02 | – | 1.05 |
|  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  | Pack-years\*age | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
|  | PM2.5 (per 10 µg/m3) | 0.90 | 0.73 | – | 1.12 | 0.92 | 0.74 | – | 1.14 |
|  | Smoking average packs | 43.01 | 24.37 | – | 75.92 | 42.72 | 24.01 | – | 75.99 |
|  | Smoking duration (years) | 1.09 | 1.08 | – | 1.11 | 1.09 | 1.07 | – | 1.11 |
|  | Smoking cessation (months) | 1.00 | 1.00 | – | 1.00 | 1.00 | 1.00 | – | 1.00 |
| aStratified by time period and age in months (in absence of age interaction), and adjusted for geographic region; also adjusted for age in months (in presence of age interaction) | | | | | | | | | |
| bStratified by time period and age in months (in absence of age interaction), and adjusted for geographic region, body mass index, alcohol consumption, physical activity, overall diet quality, census tract median house value, census tract median income, and secondhand smoke exposure at home, at work, and during childhood; also adjusted for age in months (in presence of age interaction) | | | | | | | | | |
| AIC: Akaike information criterion; CI: confidence interval; HR: hazard ratio; PM2.5: particulate matter < 2.5 µm in aerodynamic diameter | | | | | | | | | |