

Supplementary Appendix:

Table S1: Sample characteristics stratified by middle-age leisure-time physical activity (LTPA)

Table S2: Healthcare cost by middle-age leisure-time physical activity (LTPA) levels in males (N=11,798) and females (N=9,952) during 1999-2008

Table S3: Sample characteristics stratified by leisure-time physical activity (LTPA) trajectories (maintainers and increasers)

Table S4: Sample characteristics stratified by leisure-time physical activity (LTPA) trajectories (decreasers)

Table S5: Distributions of LTPA trajectories by Medicare linkage reason and vital status at end of observation period.

Table S6: Association between leisure-time physical activity (LTPA) trajectory and average annual healthcare cost in later life in 1999 to 2008 stratified by sex (Model 1)

Table S7: Association between leisure-time physical activity (LTPA) trajectory and average annual healthcare cost in later life in 1999 to 2008 stratified by sex (Model 2)

Table S8: Distribution of trajectories after excluding respondents with trajectory assignment probability <80% and excluding the last 12 months of claims data (Model 2)

Table S9: Sensitivity analysis excluding respondents with trajectory assignment probability <80% and excluding the last 12 months of claims data (Model 2)

Figure S1: Flow diagram of the exclusion criteria.

Figure S2: Item included in the AARP Risk Factor Questionnaire to assess participation in leisure-time physical activity at ages 15-18 years, 19-29 years, 35-39 years, and in the past 10 years (assumed as 43-64 years)

Figure S3: Association between leisure-time physical activity (LTPA) trajectory and average annual healthcare cost in later life in 1999 to 2008 (Model 2)

Table S1: Sample characteristics stratified by middle-age leisure-time physical activity (LTPA)

| Characteristic | Middle-age Leisure Time Physical Activity | | | | |
|---------------------------------|---|------------------------|-------------------------|-------------------------|------------------------|
| | Overall (N=21,750) | <1h/week (N= 4,916) | 1-3 h/week (N=5,635) | 4-7 h/week (N=5,774) | >7 h/week (N=5,425) |
| Mean age (SD) at baseline RFQ | 59.9 (3.2) | 59.7 (3.2) | 59.7 (3.2) | 59.9 (3.2) | 60.1 (3.1) |
| Sex (%) | | | | | |
| Male | 11,798 (54.2) | 2,711 (55.2) | 3,071 (54.5) | 3,101(53.7) | 2,915 (53.7) |
| Female | 9,952 (45.8) | 2,205 (44.8) | 2,564 (45.5) | 2,673 (46.3) | 2,510 (46.3) |
| Race/ethnicity (%) | | | | | |
| White, non-Hispanic | 20,609 (94.8) | 4,585 (93.3) | 5,322 (94.5) | 5,520 (95.6) | 5,182 (95.6) |
| Black, non-Hispanic | 564 (2.6) | 178 (3.6) | 161 (2.9) | 117 (2.0) | 108 (2.0) |
| Hispanic | 215 (1.0) | 55 (1.1) | 56 (1.0) | 55 (1.0) | 49 (0.9) |
| Asian/Pacific Islander | 199 (1.0) | 55 (1.1) | 55 (1.0) | 40 (0.7) | 49 (0.9) |
| Unknown | 163 (0.8) | 43 (0.9) | 41 (0.7) | 42 (0.7) | 37 (0.7) |
| Education level (%) | | | | | |
| < 8 years schooling | 596 (2.7) | 175 (3.6) | 136 (2.5) | 122 (2.7) | 163 (3.0) |
| 8-11 years schooling | 4,149 (19.1) | 986 (20.1) | 1,017 (18.1) | 1,063 (18.0) | 1,108 (20.4) |
| 12+ or completed HS | 2,214 (10.2) | 519 (10.6) | 573 (10.2) | 538 (10.0) | 543 (10.0) |
| Post-HS or some college | 5,267 (24.2) | 1,227 (25.0) | 1,334 (23.7) | 1,382 (23.9) | 1,324 (24.4) |
| College degree + | 9,113 (41.9) | 1,924 (39.1) | 2,472(43.9) | 2,553 (44.2) | 2,164 (39.9) |
| Unknown | 411 (1.9) | 85 (1.7) | 103 (1.8) | 100 (1.7) | 123 (2.3) |
| Marital status (%) | | | | | |
| Married | 15,718 (72.3) | 3,412 (69.4) | 4,063 (72.1) | 4,210 (72.9) | 4,033 (74.3) |
| Widowed | 1,777 (8.2) | 421 (8.6) | 452 (8.0) | 455 (7.9) | 449 (8.3) |
| Divorced | 2,796 (12.9) | 653 (13.3) | 716 (12.7) | 767 (13.3) | 660 (12.2) |
| Separated | 169 (0.8) | 41 (0.8) | 43 (0.8) | 44 (0.8) | 41 (0.8) |
| Never married | 1,197 (5.5) | 368 (7.5) | 337 (6.0) | 276 (4.8) | 216 (4.0) |
| Unknown | 93 (0.4) | 21 (0.4) | 24 (0.4) | 22 (0.4) | 26 (0.5) |
| Smoking history ever (%) | | | | | |
| Never smoker | 8,261 (38.0) | 1,801 (36.6) | 2,163 (38.4) | 2,231 (38.6) | 2,066 (38.1) |
| Former smoker, <=20/day | 5,950 (27.4) | 1,210 (24.6) | 1,499 (26.6) | 1,674 (29.0) | 1,567 (28.9) |
| Former smoker, >20/day | 4,308 (19.8) | 1,012 (20.6) | 1,125 (20.0) | 1,106 (19.2) | 1,065 (19.6) |

| | | | | | |
|--|---------------|--------------|--------------|--------------|--------------|
| Current smoker, ≤20 cigs/day | 1,640 (7.5) | 441 (9.0) | 409 (7.3) | 397 (6.9) | 393 (7.2) |
| Current smoker, >20 cigs/day | 953 (4.4) | 292 (5.9) | 278 (4.9) | 208 (3.6) | 175 (3.2) |
| Unknown | 638 (2.9) | 160 (3.3) | 161 (2.9) | 158 (2.7) | 159 (2.9) |
| SR Health status at RFQ (%) | | | | | |
| Excellent | 4,231 (19.5) | 565 (11.5) | 907 (16.1) | 1,235 (21.4) | 1,524 (28.1) |
| Very good | 8,498 (39.1) | 1,677 (34.1) | 2,211 (39.2) | 2,356 (40.8) | 2,254 (41.6) |
| Good | 7,273 (33.4) | 2,039 (41.5) | 2,044 (36.3) | 1,821 (31.6) | 1,369 (25.2) |
| Fair | 1,518 (7.0) | 584 (11.9) | 399 (7.1) | 303 (5.3) | 232 (4.3) |
| Unknown | 230 (1.1) | 51 (1.0) | 74 (1.3) | 59 (1.0) | 46 (0.9) |
| Clinical condition at RFQ (%) | | | | | |
| Any Health Problem | 7,447 (34.2) | 1,950 (39.7) | 1,919 (34.1) | 1,863 (32.3) | 1,715 (31.6) |
| History of heart disease | 2,145 (9.9) | 528 (10.7) | 561 (10.0) | 557 (9.7) | 499 (9.2) |
| History of diabetes | 1,424 (6.6) | 475 (9.7) | 373 (6.6) | 318 (5.5) | 258 (4.8) |
| History of osteoporosis | 595 (2.7) | 137 (2.8) | 164 (2.9) | 152 (2.8) | 142 (2.6) |
| History of stroke | 227 (1.0) | 75 (1.5) | 47 (0.8) | 57 (1.0) | 48 (0.9) |
| BMI Category @ RFQ (%) | | | | | |
| Normal weight (<25 kg m ⁻²) | 8,107 (37.3) | 1,410 (28.7) | 1,925 (34.2) | 2,343 (40.6) | 2,429 (44.8) |
| Overweight (25-29.9 kg.m ⁻²) | 8,922 (41.0) | 1,940 (39.5) | 2,378 (42.1) | 2,443 (42.3) | 2,165 (39.9) |
| Obese (≥30 kg m ⁻²) | 4,397 (20.2) | 1,480 (30.1) | 1,241 (22.0) | 915 (15.9) | 761 (14.0) |
| Unknown | 324 (1.5) | 86 (1.8) | 95 (1.7) | 73 (1.3) | 70 (1.3) |
| BMI Category @ age 18 (%) | | | | | |
| Normal weight (<25 kg m ⁻²) | 18,052 (83.0) | 3,993 (81.2) | 4,674 (83.0) | 4,818 (83.4) | 4,567 (84.2) |
| Overweight (25-29.9 kg.m ⁻²) | 1,988 (9.1) | 497 (10.1) | 504 (8.9) | 523 (9.1) | 464 (8.6) |
| Obese (≥30 kg m ⁻²) | 307 (1.4) | 106 (2.2) | 80 (1.4) | 66 (1.1) | 55 (1.0) |
| Unknown | 1,403 (6.5) | 320 (6.5) | 377 (6.7) | 367 (6.4) | 339 (6.3) |
| Television viewing (%) | | | | | |
| 0-2 hours/day | 7,859 (36.1) | 1,600 (32.6) | 1,997 (35.4) | 2,175 (37.7) | 2,087 (38.5) |
| 3-4 hours/day | 9,872 (45.4) | 2,219 (45.1) | 2,640 (46.9) | 2,613 (45.3) | 2,400 (44.2) |
| 5+ hours/day | 3,964 (18.2) | 1,085 (22.1) | 988 (17.5) | 969 (16.8) | 922 (17.0) |
| Unknown | 55 (0.3) | 12 (0.2) | 10 (0.2) | 17 (0.3) | 16 (0.3) |
| *State of Residence (%) | | | | | |
| California | 5,489 (25.2) | 1,158 (21.1) | 1,377 (25.1) | 1,515 (27.6) | 1,439 (26.2) |
| Florida | 4,835 (22.2) | 993 (20.5) | 1,225(25.3) | 1,277 (26.4) | 1,340 (27.7) |

| | | | | | |
|--------------------|--------------|------------|------------|------------|------------|
| Georgia (Atlanta) | 745 (3.4) | 188 (25.2) | 178 (23.9) | 231 (31.0) | 148 (19.9) |
| Louisiana | 876 (4.0) | 226 (25.8) | 238 (27.2) | 196 (22.4) | 216 (24.7) |
| Michigan (Detroit) | 1,291 (5.9) | 351 (27.2) | 365 (28.3) | 329 (25.5) | 246 (19.1) |
| North Carolina | 2,441 (11.2) | 514 (21.1) | 639 (26.2) | 689 (28.2) | 599 (24.5) |
| New Jersey | 3,349 (15.4) | 842 (25.1) | 888 (26.5) | 852 (25.4) | 767 (22.9) |
| Pennsylvania | 2,724 (12.5) | 644 (23.6) | 725 (26.6) | 685 (25.2) | 670 (24.6) |

Source: Authors' analysis of NIH-AARP Diet and Health Survey's Risk Factor Questionnaire linked to Medicare claims. Percentage rounded to one decimal place and may not total 100%.

*State of residence for overall column is N (%). Stratifying by Middle-age LTPA is reported as N and as row percentage.

Table S2: Healthcare cost by middle-age leisure-time physical activity (LTPA) levels overall (N=21,750), males (N=11,798) and females (N=9,952)

| Middle-age LTPA Status | Unadjusted | | Multivariable-adjusted | | | |
|---------------------------|---|-----------------------------------|--|-----------------------------------|--|-----------------------------------|
| | Healthcare cost difference (95% CI) | Percent Difference (95% CI) | Model 1: Healthcare cost difference (95% CI) | Percent Difference (95% CI) | Model 2: Healthcare cost difference (95% CI) | Percent Difference (95% CI) |
| Overall | | | | | | |
| <1 hour/week | REF | | REF | | REF | |
| 1-3 hours/week | -\$1,642 (-\$2,206, -\$1,079) | -17.7 (-23.7, -11.6) | -\$1,365 (-\$1,913, -\$815) | -15.0 (-21.0, -9.0) | -\$1,188 (-\$1,726, -\$650) | -13.4 (-19.5, -7.3) |
| 4-7 hours/week | -\$1,888 (-\$2,438, -\$1,338) | -20.3 (-26.2, -14.8) | -\$1,592 (-\$2,130, -\$1,053) | -17.5 (-23.4, -11.6) | -\$1,251 (-\$1,785, -\$718) | -14.1 (-20.2, -8.1) |
| 7+ hours/week | -\$2,255 (-\$2,806, -\$1,704) | -24.2 (-30.2, -18.3) | -\$2,079 (-\$2,613, \$1,546) | -22.8 (-28.7, -17.0) | -\$1,676 (-\$2,213, -\$1,139) | -18.9 (-25.0, -12.9) |
| Males | | | | | | |
| <1 hour/week | REF | | REF | | REF | |
| 1-3 hours/week | -\$1,744 (-\$2,509, -\$978) | -18.1 (-26.0, -10.1) | -\$1,457 (-\$2,213, -\$701) | -15.3 (-23.2, -7.4) | -\$1,372 (-\$2,120, -\$624) | -14.7 (-22.7, -6.7) |
| 4-7 hours/week | -\$2,039 (-\$2,802, -\$1,276) | -21.1 (-29.0, -13.2) | -\$1,736 (-\$2,497, -\$976) | -18.2 (-26.2, -10.2) | -\$1,564 (-\$2,317, -\$811) | -16.7 (-24.8, -8.7) |
| 7+ hours/week | -\$2,040 (-\$2,809, -\$1,270) | -21.1 (-29.1, -13.2) | -\$1,951 (-\$2,700, -\$1,202) | -20.5 (-28.3, -12.6) | -\$1,746 (-\$2,500, -\$991) | -18.7 (-29.5, -10.6) |

| | | | | | | |
|----------------|----------------------------------|-------------------------|----------------------------------|-------------------------|--------------------------------|-------------------------|
| Females | | | | | | |
| <1 hour/week | REF | | REF | | REF | |
| 1-3 hours/week | -\$1,510 (-\$2,342, -\$678) | -17.0 (-26.4, -7.6) | -\$1,288 (-\$2,090, -\$481) | -14.5 (-23.6, -5.4) | -\$970 (-\$1,745, -\$195) | -11.7 (-21.0, -2.3) |
| 4-7 hours/week | -\$1,689 (-\$2,480, -\$897) | -19.0 (-27.9, -10.1) | -\$1,456 (-\$2,217, -\$696) | -16.4 (-25.0, -7.8) | -\$904 (-\$1,657, -\$152) | -10.9 (-19.9, -1.8) |
| 7+ hours/week | -\$2,481 (-\$3,266, -\$1,696) | -28.0 (-36.8, -19.1) | -\$2,309 (-\$3,064, -\$1,554) | -26.0 (-34.5, -17.5) | -\$1,644 (-\$2,395, -\$892) | -19.8 (-28.8, -10.7) |

Model 1: Adjusted for age, marital status, race/ethnicity, education attainment, smoking status, BMI at age 18, location of residence and television viewing status. Model 2: Includes all variables from Model 1 and BMI at time of risk factor questionnaire. Reference costs - Overall: Unadjusted: \$9,302/year; Model 1: \$9,101/year; Model 2: \$8,855/year. Males: Unadjusted \$9,649/year; Model 1: \$9,526/year, Model 2: \$9,347/year. Females: Unadjusted \$8,876/year; Model 1: \$8,870/year; Model 2: \$8,320/year during 1999-2008. Modified Park Test – Poisson. In female model 1 (N=9,777) and model 2 (N=9,588) observations dropped due to collinearity.

Table S3: Sample characteristics stratified by leisure-time physical activity (LTPA) trajectories (maintainers and increasers)

| Characteristic | Leisure Time Physical Activity Trajectory (N, %) | | | | |
|---------------------------------|--|-------------------|-------------------|------------------|------------------|
| | 1 4,016 (18.4) | 8 5,220 (24.0) | 3 2,724 (12.5) | 2 1,988 (9.1) | 4 1,168 (5.4) |
| Mean age (SD) at baseline RFQ | 59.7 (3.2) | 60.1 (3.1) | 59.9 (3.1) | 60.0 (3.2) | 59.8 (3.0) |
| Sex (%) | | | | | |
| Male | 1,856 (46.2) | 2,945 (56.4) | 1,746 (64.1) | 899 (45.2) | 354 (30.3) |
| Female | 2,160 (53.8) | 2,275 (43.6) | 978 (35.9) | 1,089 (54.8) | 814 (69.7) |
| Race/ethnicity (%) | | | | | |
| White, non-Hispanic | 3,741 (93.2) | 4,983 (95.5) | 2,612 (95.9) | 1,900 (95.6) | 1,122 (95.2) |
| Black, non-Hispanic | 152 (3.8) | 109 (2.1) | 53 (2.0) | 39 (2.0) | 23 (2.0) |
| Hispanic | 39 (1.0) | 44 (0.8) | 26 (1.0) | 17 (0.9) | 17 (1.5) |
| Asian/Pacific Islander | 52 (1.3) | 41 (0.8) | 20 (0.7) | 17 (0.9) | 10 (0.9) |
| Unknown | 32 (0.8) | 43 (0.8) | 13 (0.5) | 15 (0.8) | 6 (0.5) |
| Education level (%) | | | | | |
| < 8 years schooling | 164 (4.1) | 137 (2.6) | 57 (2.1) | 52 (2.6) | 39 (3.3) |
| 8-11 years schooling | 929 (23.1) | 1,040 (19.9) | 392 (14.4) | 405 (20.4) | 299 (25.6) |
| 12+ or completed HS | 419 (10.4) | 562 (10.8) | 246 (9.0) | 190 (9.6) | 117 (10.0) |
| Post-HS or some college | 882 (22.0) | 1,328 (25.4) | 616 (22.6) | 454 (22.8) | 287 (24.6) |
| College degree | 1,561 (38.9) | 2,034 (39.0) | 1,366 (50.2) | 853 (42.9) | 405 (34.7) |
| Unknown | 61 (1.5) | 119 (2.3) | 47 (1.7) | 34 (1.7) | 21 (1.8) |
| Marital status (%) | | | | | |
| Married | 2,683 (66.8) | 3,905 (74.8) | 2,115 (77.6) | 1,354 (68.1) | 785 (67.2) |
| Widowed | 392 (9.8) | 394 (7.6) | 171 (6.3) | 186 (9.4) | 148 (12.7) |
| Divorced | 521 (13.0) | 666 (12.8) | 295 (10.8) | 279 (14.0) | 180 (15.4) |
| Separated | 35 (0.9) | 44 (0.8) | 11 (0.4) | 19 (1.0) | 11 (1.0) |
| Never married | 361 (9.0) | 185 (3.5) | 121 (4.4) | 142 (7.1) | 41 (3.5) |
| Unknown | 24 (0.6) | 26 (0.5) | 11 (0.4) | 8 (0.4) | 3 (0.3) |
| Smoking history ever (%) | | | | | |
| Never smoker | 1,660 (41.3) | 1,986 (38.1) | 1,003 (36.8) | 759 (38.2) | 518 (44.4) |
| Former smoker, ≤20/day | 1,024 (25.5) | 1,449 (27.8) | 834 (30.6) | 613 (30.8) | 314 (26.9) |
| Former smoker, >20/day | 701 (17.5) | 968 (18.5) | 582 (21.4) | 421 (21.2) | 167 (14.3) |

| | | | | | |
|--|--------------|--------------|--------------|--------------|------------|
| Current smoker, ≤20 cigs/day | 322 (8.0) | 442 (8.5) | 147 (5.4) | 99 (5.0) | 102 (8.7) |
| Current smoker, >20 cigs/day | 174 (4.3) | 219 (4.2) | 87 (3.2) | 40 (2.0) | 35 (3.0) |
| Unknown | 135 (3.4) | 156 (3.0) | 71 (2.6) | 56 (2.8) | 32 (2.7) |
| SR Health status at RFQ (%) | | | | | |
| Excellent | 628 (15.6) | 1,218 (23.3) | 713 (26.2) | 523 (26.3) | 278 (23.8) |
| Very good | 1,433 (35.7) | 2,142 (41.0) | 1,118 (41.0) | 822 (41.4) | 487 (41.7) |
| Good | 1,561 (38.9) | 1,535 (29.4) | 757 (27.8) | 537 (27.0) | 335 (28.7) |
| Fair | 354 (8.8) | 272 (5.2) | 110 (4.0) | 90 (5.9) | 58 (5.0) |
| Unknown | 40 (1.0) | 53 (1.0) | 26 (1.0) | 16 (0.8) | 10 (0.9) |
| Clinical condition at RFQ (%) | | | | | |
| Any health problem | 1,408 (35.1) | 1,679 (32.2) | 840 (30.8) | 676 (34.0) | 347 (29.7) |
| History of heart disease | 371 (9.2) | 484 (9.3) | 280 (10.3) | 210 (10.6) | 68 (5.8) |
| History of diabetes | 299 (7.4) | 255 (4.9) | 149 (5.5) | 123 (6.2) | 44 (3.8) |
| History of osteoporosis | 137 (3.4) | 132 (2.5) | 46 (1.7) | 69 (3.5) | 44 (3.8) |
| History of stroke | 44 (1.1) | 59 (1.1) | 20 (0.7) | 19 (1.0) | 7 (0.6) |
| BMI Category @ RFQ (%) | | | | | |
| Normal weight (<25 kg m ⁻²) | 1,481 (36.9) | 2,015 (38.6) | 1,165 (42.8) | 963 (48.4) | 586 (50.2) |
| Overweight (25-29.9 kg.m ⁻²) | 1,518 (37.8) | 2,271 (43.5) | 1,169 (42.9) | 731 (36.8) | 396 (33.9) |
| Obese (≥30 kg m ⁻²) | 939 (23.4) | 873 (16.7) | 359 (13.2) | 263 (13.2) | 166 (14.2) |
| Unknown | 78 (2.0) | 61 (1.2) | 31 (1.1) | 31 (1.6) | 20 (1.7) |
| BMI Category @ age 18 (%) | | | | | |
| Normal weight (<25 kg m ⁻²) | 3,238 (80.6) | 4,399 (84.3) | 2,289 (84.0) | 1,629 (81.9) | 980 (83.9) |
| Overweight (25-29.9 kg.m ⁻²) | 372 (9.3) | 459 (8.8) | 274 (10.1) | 178 (9.0) | 70 (6.0) |
| Obese (≥30 kg m ⁻²) | 87 (2.2) | 50 (1.0) | 22 (1.0) | 33 (1.7) | 14 (1.2) |
| Unknown | 319 (7.9) | 312 (6.0) | 139 (5.1) | 148 (7.4) | 104 (8.9) |
| Television viewing (%) | | | | | |
| 0-2 hours/day | 1,467 (36.5) | 1,895 (36.3) | 1,095 (40.2) | 760 (38.2) | 477 (40.8) |
| 3-4 hours/day | 1,780 (44.3) | 2,359 (45.2) | 1,193 (43.8) | 898 (45.2) | 514 (44.0) |
| 5+ hours/day | 759 (18.9) | 951 (18.2) | 429 (45.8) | 323 (16.3) | 173 (14.8) |
| Unknown | 10 (0.3) | 15 (0.3) | 7 (0.3) | 7 (0.4) | 4 (0.3) |
| *State of Residence (%) | | | | | |
| California (N=5,489) | 868 (15.8) | 1,366 (24.9) | 750 (13.7) | 531 (9.7) | 280 (5.1) |
| Florida (N=4,835) | 830 (17.2) | 1,205 (24.9) | 622 (12.9) | 494 (10.2) | 271 (5.6) |

| | | | | | |
|------------------------------|------------|------------|------------|-----------|-----------|
| Georgia (Atlanta) (N=745) | 132 (17.7) | 150 (20.1) | 112 (15.0) | 75 (10.0) | 38 (5.1) |
| Louisiana (N=876) | 171 (19.5) | 214 (24.4) | 92 (10.5) | 61 (7.0) | 40 (4.6) |
| Michigan (Detroit) (N=1,291) | 293 (22.7) | 260 (20.1) | 144 (11.2) | 100 (7.7) | 68 (5.3) |
| North Carolina (N=2,441) | 470 (19.3) | 618 (25.3) | 316 (12.9) | 211 (8.6) | 133 (5.4) |
| New Jersey (N=3,349) | 724 (21.6) | 729 (21.8) | 376 (11.2) | 301 (9.0) | 200 (6.0) |
| Pennsylvania (N=2,724) | 528 (19.4) | 678 (24.9) | 312 (11.5) | 215 (7.9) | 138 (5.1) |

Source: Authors' analysis of NIH-AARP Diet and Health Survey's Risk Factor Questionnaire linked to Medicare claims. Percentage rounded to one decimal place and may not total 100%.

*State of residence for overall column is N (%). Stratifying by Middle-age LTPA is reported as N and as row percentage.

Table S4: Sample characteristics stratified by leisure-time physical activity (LTPA) trajectories (Decreasers)

| Characteristic | Leisure Time Physical Activity Trajectory (N, %) | | | |
|---------------------------------|--|------------------|------------------|------------------|
| | 5 1,128 (5.2) | 6 2,028 (9.3) | 7 1,676 (7.7) | 9 1,802 (8.3) |
| Mean age (SD) at baseline RFQ | 59.9 (3.2) | 60.0 (3.1) | 59.5 (3.2) | 59.5 (3.2) |
| Sex (%) | | | | |
| Male | 448 (39.7) | 1,250 (61.6) | 1,080 (64.4) | 1,220 (67.7) |
| Female | 680 (60.3) | 778 (38.4) | 596 (35.6) | 582 (32.3) |
| Race/ethnicity (%) | | | | |
| White, non-Hispanic | 1,076 (95.4) | 1,916 (94.5) | 1,574 (93.9) | 1,695 (94.1) |
| Black, non-Hispanic | 23 (2.0) | 65 (3.2) | 46 (2.7) | 54 (3.0) |
| Hispanic | 11 (1.0) | 20 (1.0) | 20 (1.2) | 21 (1.2) |
| Asian/Pacific Islander | 8 (0.7) | 9 (0.4) | 20 (1.2) | 22 (1.2) |
| Unknown | 10 (0.9) | 18 (0.9) | 16 (1.0) | 10 (0.6) |
| Education level (%) | | | | |
| < 8 years schooling | 24 (2.1) | 54 (2.7) | 28 (1.7) | 41 (2.3) |
| 8-11 years schooling | 217 (19.2) | 334 (16.5) | 261 (15.6) | 272 (15.1) |
| 12+ or completed HS | 107 (9.5) | 224 (11.1) | 178 (10.6) | 171 (9.5) |
| Post-HS or some college | 297 (26.3) | 560 (27.6) | 411 (24.5) | 432 (24.0) |
| College degree | 453 (40.2) | 814 (40.1) | 773 (46.1) | 854 (47.4) |
| Unknown | 30 (2.7) | 42 (2.1) | 25 (1.5) | 32 (1.8) |
| Marital status (%) | | | | |
| Married | 759 (67.3) | 1,454 (71.7) | 1,276 (76.1) | 1,387 (77.0) |
| Widowed | 119 (10.6) | 162 (8.0) | 103 (6.2) | 102 (5.7) |
| Divorced | 190 (16.8) | 285 (14.1) | 186 (11.1) | 194 (10.8) |
| Separated | 12 (1.1) | 17 (0.8) | 11 (0.7) | 9 (0.5) |
| Never married | 44 (3.9) | 100 (4.9) | 97 (5.8) | 106 (5.9) |
| Unknown | 4 (0.4) | 10 (0.5) | 3 (0.2) | 4 (0.2) |
| Smoking history ever (%) | | | | |
| Never smoker | 437 (38.7) | 638 (31.5) | 633 (37.8) | 627 (34.8) |
| Former smoker, ≤20/day | 303 (26.9) | 524 (25.8) | 421 (25.1) | 468 (26.0) |
| Former smoker, >20/day | 206 (18.3) | 471 (23.2) | 381 (22.7) | 411 (22.8) |

| | | | | |
|--|------------|--------------|--------------|--------------|
| Current smoker, ≤20 cigs/day | 100 (8.9) | 188 (9.3) | 108 (6.4) | 132 (7.3) |
| Current smoker, >20 cigs/day | 57 (5.1) | 149 (7.4) | 83 (5.0) | 109 (6.1) |
| Unknown | 25 (2.2) | 58 (2.9) | 50 (3.0) | 55 (3.1) |
| SR Health status at RFQ (%) | | | | |
| Excellent | 147 (13.0) | 243 (12.0) | 275 (16.4) | 206 (11.4) |
| Very good | 450 (39.9) | 726 (35.8) | 632 (37.7) | 688 (38.2) |
| Good | 423 (37.5) | 784 (38.7) | 622 (37.1) | 719 (39.9) |
| Fair | 94 (8.3) | 247 (12.2) | 124 (7.4) | 169 (9.4) |
| Unknown | 14 (1.2) | 28 (1.4) | 23 (1.4) | 20 (1.1) |
| Clinical condition at RFQ (%) | | | | |
| Any health problem | 420 (37.2) | 793 (39.1) | 628 (37.5) | 656 (36.4) |
| History of heart disease | 113 (10.0) | 225 (11.1) | 189 (11.3) | 205 (11.4) |
| History of diabetes | 84 (7.5) | 179 (8.8) | 136 (8.1) | 155 (8.6) |
| History of osteoporosis | 34 (3.0) | 52 (2.6) | 41 (2.5) | 40 (2.2) |
| History of stroke | 13 (1.2) | 35 (1.7) | 19 (1.1) | 11 (0.6) |
| BMI Category @ RFQ (%) | | | | |
| Normal weight (<25 kg m ⁻²) | 383(34.0) | 520 (25.6) | 535 (31.9) | 459 (25.5) |
| Overweight (25-29.9 kg.m ⁻²) | 441 (39.1) | 890 (43.9) | 678 (40.5) | 828 (46.0) |
| Obese (≥30 kg m ⁻²) | 281 (24.9) | 598 (29.5) | 430 (25.7) | 488 (27.1) |
| Unknown | 23 (2.0) | 20 (1.0) | 33 (2.0) | 27 (1.5) |
| BMI Category @ age 18 (%) | | | | |
| Normal weight (<25 kg m ⁻²) | 914 (81.0) | 1,669 (82.3) | 1,419 (84.7) | 1,515 (84.1) |
| Overweight (25-29.9 kg.m ⁻²) | 113 (10.0) | 206 (10.2) | 142 (8.5) | 174 (9.7) |
| Obese (≥30 kg m ⁻²) | 17 (1.5) | 26 (1.3) | 27 (1.6) | 31 (1.7) |
| Unknown | 84 (7.5) | 127 (6.3) | 88 (5.3) | 82 (4.6) |
| Television viewing (%) | | | | |
| 0-2 hours/day | 391 (34.7) | 582 (28.7) | 614 (36.6) | 578 (32.1) |
| 3-4 hours/day | 533 (47.3) | 966 (47.6) | 779 (46.5) | 850 (47.2) |
| 5+ hours/day | 198 (17.6) | 478 (23.6) | 281 (16.8) | 372 (20.6) |
| Unknown | 6 (0.5) | 2 (0.1) | 2 (0.1) | 2 (0.1) |
| *State of Residence (%) | | | | |
| California (N=5,489) | 285 (5.2) | 504 (9.2) | 467 (8.5) | 438 (8.0) |
| Florida (N=4,835) | 264 (5.5) | 443 (9.2) | 352 (7.3) | 354 (7.3) |
| Georgia (Atlanta) (N=745) | 36 (4.8) | 74 (9.9) | 72 (9.7) | 56 (7.5) |

| | | | | |
|------------------------------|-----------|------------|-----------|-----------|
| Louisiana (N=876) | 40 (4.6) | 88 (10.0) | 75 (8.6) | 95 (10.8) |
| Michigan (Detroit) (N=1,291) | 75 (5.8) | 139 (10.8) | 91 (7.0) | 121 (9.3) |
| North Carolina (N=2,441) | 125 (5.1) | 231 (9.5) | 159 (6.5) | 178 (7.3) |
| New Jersey (N=3,349) | 163 (4.9) | 307 (9.2) | 239 (7.1) | 310 (9.3) |
| Pennsylvania (N=2,724) | 140 (5.1) | 242 (8.9) | 221 (8.1) | 250 (9.2) |

Source: Authors' analysis of NIH-AARP Diet and Health Survey's Risk Factor Questionnaire linked to Medicare claims. Percentage rounded to one decimal place and may not total 100%.

*State of residence for overall column is N (%). Stratifying by Middle-age LTPA is reported as N and as row percentage.

Table S5: Distributions of LTPA trajectories by Medicare linkage reason and vital status at end of observation period.

| | Maintainers | | | Increasers | | Decreasers | | | |
|--|--------------|--------------|--------------|--------------|--------------|------------|--------------|--------------|--------------|
| Trajectory | 1 (ref) | 8 | 3 | 2 | 4 | 5 | 6 | 7 | 9 |
| Medicare Linkage Reason (N, %) | | | | | | | | | |
| Alive | 3,518 (87.6) | 4,578 (87.7) | 2,414 (88.6) | 1,763 (88.7) | 1,087 (93.1) | 964 (85.5) | 1,685 (83.1) | 1,457 (86.9) | 1,574 (87.4) |
| Dead | 498 (12.4) | 642 (12.3) | 310 (11.4) | 225 (11.3) | 81 (6.9) | 164 (14.5) | 343 (16.9) | 219 (13.1) | 228 (12.7) |
| No. of years of Medicare claims (SD) | | | | | | | | | |
| Alive | 6.2 (2.9) | 6.7 (2.8) | 6.5 (2.8) | 6.5 (2.9) | 6.4 (2.9) | 6.4 (2.9) | 6.4 (2.9) | 6.1 (2.9) | 6.0 (2.8) |
| Dead | 4.7 (2.4) | 5.0 (2.4) | 5.0 (2.4) | 5.0 (2.4) | 5.0 (2.6) | 4.6 (2.4) | 4.6 (2.4) | 4.8 (2.3) | 4.7 (2.3) |
| Vital status at end of observation period - Dec 31 st , 2008 (N, %) | | | | | | | | | |
| Alive | 3,393 (84.8) | 4,414 (84.6) | 2,346 (86.1) | 1,714 (86.2) | 1,061 (90.8) | 937 (83.1) | 1,615 (80.0) | 1,405 (83.8) | 1,507 (83.6) |
| Dead | 623 (15.5) | 806 (15.4) | 378 (13.9) | 274 (13.8) | 107 (9.2) | 191 (16.9) | 413 (20.4) | 271 (18.6) | 295 (16.4) |
| Deceased at end of observation period by sex (N, % by sex) | | | | | | | | | |
| Males | 364 (19.6) | 511 (17.3) | 272 (15.6) | 156 (17.7) | 40 (11.3) | 91 (20.3) | 281 (22.5) | 201 (18.6) | 218 (17.9) |
| Females | 259 (12.0) | 295 (12.9) | 106 (10.8) | 118 (10.8) | 67 (8.2) | 100 (14.7) | 132 (17.0) | 70 (11.7) | 77 (13.2) |

Table S6: Association between leisure-time physical activity (LTPA) trajectory and average annual healthcare cost in later life in 1999 to 2008 stratified by sex (Model 1)

| Traj Number | Stratified by Sex | | | | | |
|---------------------|---------------------|---|-------------------------|-----------------------|---|------------------------|
| | Males (N=11,798) | | | Females* (N=9,952) | | |
| | N | Healthcare cost difference (\$) (95% CI) | Percent Difference | N | Healthcare cost difference (\$) (95% CI) | Percent Difference |
| Maintainers | | | | | | |
| 1** | 1,856 | Referent | Ref | 2,160 | Referent | Ref |
| 8 | 2,945 | -1,334 (-2,167, -501) | -14.9 (-24.1, -5.6) | 2,275 | -1,076 (-1,859, -294) | -13.1 (-22.6, -3.6) |
| 3 | 1,746 | -1,377 (-2,285 -469) | -15.3 (-25.4, -5.2) | 978 | -1,397 (-2,374, -420) | -17.0 (-28.9, -5.1) |
| Increasesers | | | | | | |
| 4 | 354 | -2,302 (-3,637, -968) | -25.6 (-40.5, -10.8) | 814 | -1,659 (-2,668, -650) | -20.2 (-32.5, -7.9) |
| 2 | 899 | -505 (-1,630, 621) | -5.6 (-18.2, 6.9) | 1,089 | -1,130 (-2,133, -127) | -13.7 (-25.9, -1.5) |
| Decreasers | | | | | | |
| 6 | 1,250 | -132 (-1,172, 908) | -1.5 (-13.1, 10.1) | 778 | 198 (-1,072, 1,469) | 2.4 (-13.0, 17.9) |
| 9 | 1,220 | -574 (-1,617, 469) | -6.4 (-18.0, 5.2) | 582 | 800 (-530, 2,132) | 9.7 (-6.4, 25.9) |
| 5 | 448 | -592 (-2,023, 838) | -6.6 (-22.5, 9.3) | 680 | -1,009 (-1,969, -49) | -12.3 (-24.0, -0.6) |
| 7 | 1,080 | -178 (-1,282, 926) | -2.0 (-14.3, 10.3) | 596 | -300 (-1,454, 854) | -3.6 (-17.7, 10.4) |

Modified Park Test –Poisson.

Model adjusted for age, marital status, race/ethnicity, education attainment, smoking status, BMI at age 18, location of residence and television viewing status. *Collinearity dropped 175 observations in Females **Traj 1 Reference: Males \$8,980/year; Females \$8,221/year

Table S7: Association between leisure-time physical activity (LTPA) trajectory and average annual healthcare cost in later life in 1999 to 2008 stratified by sex (Model 2)

| Traj Number | Stratified by Sex | | | | | |
|---------------------|---------------------|---|------------------------|-----------------------|---|------------------------|
| | Males (N=11,798) | | | Females* (N=9,952) | | |
| | N | Healthcare cost difference (\$) (95% CI) | Percent Difference | N | Healthcare cost difference (\$) (95% CI) | Percent Difference |
| Maintainers | | | | | | |
| 1** | 1,856 | Referent | Ref | 2,160 | Referent | Ref |
| 8 | 2,945 | -1,315 (-2,148, -482) | -14.7 (-24.1, -5.4) | 2,275 | -750 (-1,522, 23) | -9.3 (-18.8, 0.3) |
| 3 | 1,746 | -1,254 (-2,167 -341) | -14.1 (-24.3, -3.8) | 978 | -1,053 (-2,030, -76) | -13.0 (-25.1, -0.9) |
| Increasesers | | | | | | |
| 4 | 354 | -2,209 (-3,559, -859) | -24.8 (-40.0, -9.6) | 814 | -1,304 (-2,322, -285) | -16.1 (-28.7, -3.5) |
| 2 | 899 | -327 (-1,468, 814) | -3.7 (-16.5, 9.1) | 1,089 | -713 (-1,731, 305) | -8.8 (-21.4, 3.8) |
| Decreasers | | | | | | |
| 6 | 1,250 | -264 (-1,300, 772) | -3.0 (-14.5, 8.7) | 778 | -23 (-1,245, 1,200) | -0.3 (-15.4, 14.8) |
| 9 | 1,220 | -683 (-1,714, 347) | -7.7 (-19.2, 3.9) | 582 | 547 (-710, 1,805) | 6.8 (-8.8, 22.3) |
| 5 | 448 | -645 (-2,073, 783) | -7.2 (-23.3, 8.8) | 680 | -1,039 (-1,970, -108) | -12.8 (-24.3, -1.3) |
| 7 | 1,080 | -255 (-1,349, 839) | -2.9 (-15.1, 9.4) | 596 | -426 (-1,534, 681) | -5.3 (-18.9, 8.4) |

Modified Park Test – Poisson.

Model adjusted for age, marital status, race/ethnicity, education attainment, smoking status, BMI at age 18, location of residence and television viewing status and BMI at time of risk factor questionnaire. *Collinearity present and therefore dropped 364 observations in model with females **Traj 1 Reference: Males \$8,916/year; Females \$8,096/year

Table S8: Distribution of trajectories after excluding respondents with trajectory assignment probability <80% and excluding the last 12 months of claims data

| | Excluding | | | | | | | |
|---------------------|--|------------------|---------------------------------------|--------------------------------------|--|------------------|---------------------------------------|--------------------------------------|
| | respondents with trajectory assignment probabilities < 80% (N=18,883) | | | | Last 12 months of claims (N=20,234) | | | |
| | N (%) | % initial sample | Medicare linkage reason = alive N (%) | No. of years of Medicare claims (SD) | N (%) | % initial sample | Medicare linkage reason = alive N (%) | No. of years of Medicare claims (SD) |
| Maintainers | | | | | | | | |
| 1 | 3,808 (20.2) | 94.8 | 3,338 (87.7) | 6.0 (2.8) | 3,686 (18.2) | 91.8 | 3,272 (88.8) | 5.5 (2.5) |
| 8 | 4,897 (25.9) | 93.8 | 4,289 (87.6) | 6.4 (2.8) | 4,964 (24.5) | 95.1 | 4,414 (88.9) | 5.8 (2.5) |
| 3 | 2,088 (11.1) | 76.7 | 1,852 (88.7) | 6.2 (2.8) | 2,550 (12.6) | 93.6 | 2,281 (89.5) | 5.7 (2.5) |
| Increasesers | | | | | | | | |
| 4 | 909 (4.8) | 97.7 | 850 (93.5) | 6.4 (2.9) | 1,098 (5.4) | 94.0 | 1,029 (93.7) | 5.8 (2.5) |
| 2 | 1,943 (10.3) | 77.8 | 1,722 (88.6) | 6.3 (2.9) | 1,839 (9.1) | 92.5 | 1,649 (89.7) | 5.8 (2.5) |
| Decreasers | | | | | | | | |
| 6 | 1,466 (7.8) | 72.3 | 1,201 (81.9) | 6.1 (2.9) | 1,880 (9.3) | 92.7 | 1,601 (85.2) | 5.5 (2.5) |
| 9 | 1,774 (9.4) | 98.4 | 1,549 (87.3) | 5.8 (2.8) | 1,648 (8.1) | 91.5 | 1,455 (83.3) | 5.3 (2.6) |
| 5 | 438 (2.3) | 38.8 | 377 (86.1) | 6.3 (3.0) | 1,030 (5.1) | 91.3 | 890 (86.4) | 5.6 (2.6) |
| 7 | 1,560 (8.3) | 93.1 | 1,353 (86.7) | 5.9 (2.9) | 1,539 (7.6) | 91.8 | 1,350 (87.9) | 5.3 (2.6) |

Table S9: Sensitivity analysis excluding respondents with trajectory assignment probability <80% and excluding the last 12 months of claims data (Model 2)

| Traj Number | Excluding | | | | | |
|---------------------|--|--|-----------------------------|-------------------------------------|--|-----------------------------|
| | respondents with trajectory assignment probabilities < 80% (N=18,883)* | | | last 12 months of claims (N=20,234) | | |
| | N | Healthcare cost difference (\$) (95% CI) | Percent Difference (95% CI) | N | Healthcare cost difference (\$) (95% CI) | Percent Difference (95% CI) |
| Maintainers | | | | | | |
| 1 | 3,808 | Referent | Ref | 3,686 | Referent | Ref |
| 8 | 4,897 | -966 (-1,550, -381) | -11.5 (-18.5, -4.5) | 4,964 | -618 (-1,008, -227) | -10.4 (-17.0, -3.8) |
| 3 | 2,088 | -1,037 (-1,758, -315) | -12.3 (-20.9, -3.8) | 2,550 | -812 (-1,249, -376) | -13.7 (-21.0, -6.3) |
| Increasesers | | | | | | |
| 4 | 909 | -1,517 (-2,457, -557) | -18.1 (-29.3, -6.6) | 1,098 | -792 (-1,386, -199) | -13.3 (-23.3, -3.3) |
| 2 | 1,943 | -443 (-1,220, 334) | -5.3 (-14.5, 4.0) | 1,839 | -300 (-803, 202) | -5.0 (-13.5, 3.4) |
| Decreasers | | | | | | |
| 6 | 1,466 | -59 (-942, 824) | -0.7 (-11.2, 9.8) | 1,880 | -378 (-877, 121) | -6.4 (-14.8, 0.2) |
| 9 | 1,774 | -207 (-990, 576) | -2.5 (-11.8, 6.9) | 1,648 | -67 (-619, 485) | -1.2 (-10.4, 8.2) |
| 5 | 438 | -957 (-2,031, 117) | -11.4 (-24.2, 1.4) | 1,030 | -551 (-1,118, 17) | -9.3 (-18.8, 0.3) |
| 7 | 1,560 | -236 (-1,032, 560) | -2.8 (-12.3, 6.7) | 1,539 | -246 (-767, 275) | 4.1 (-12.9, 4.6) |

Modified Park Test – Poisson.

Model adjusted for age, marital status, race/ethnicity, education attainment, smoking status, BMI at age 18, location of residence and television viewing status and BMI at time of risk factor questionnaire. * Collinearity present and therefore dropped 279 observations

**Traj 1 Reference: trajectory assignment probabilities < 80% \$8,399; Last 12 months of claims \$5,941

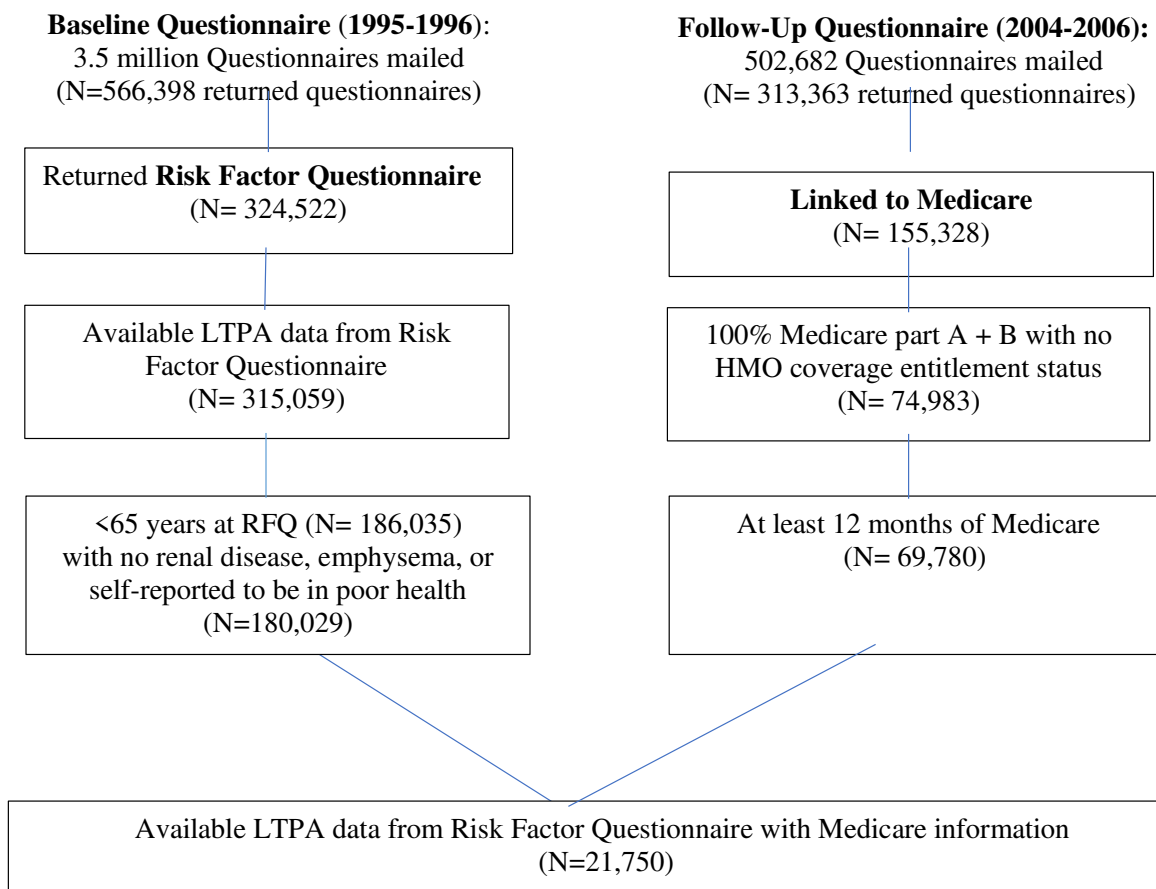


Figure S1: Flow diagram of the exclusion criteria.

55. Read the list of examples of moderate and vigorous activities in the box below.

| EXAMPLES OF MODERATE AND VIGOROUS ACTIVITIES: | | | |
|---|---------------------|---------------------------|-----------------|
| Tennis | Heavy gardening | Cheerleading/drill team | Rowing |
| Golf (walking) | Weight lifting | Handball/racquetball | Aerobics |
| Biking | Basketball/baseball | Hiking/climbing mountains | Jogging/running |
| Swimming | Football/soccer | Fast walking/fast dancing | Heavy housework |

Think back to the ages and times listed in the table below. Mark the circles that best describe how often you participated in moderate and vigorous activities at the ages and time listed. DO NOT INCLUDE ACTIVITIES THAT YOU REPORTED IN QUESTIONS 48 - 51 ON PAGE 13.

| How often did you participate in moderate and vigorous activities at the following ages and time? | HOW OFTEN (MARK ONLY ONE RESPONSE) | | | | | |
|---|------------------------------------|-----------------------|---------------------------------------|-----------------------|-----------------------|----------------------------|
| | Never | Rarely | Weekly, but less than 1 hour per week | 1-3 hours per week | 4-7 hours per week | More than 7 hours per week |
| 15-18 years old | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19-29 years old | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 35-39 years old | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| in the past 10 years | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Figure S2: Item included in the AARP Risk Factor Questionnaire to assess participation in leisure-time physical activity at ages 15-18 years, 19-29 years, 35-39 years, and in the past 10 years (assumed as 43-64 years).

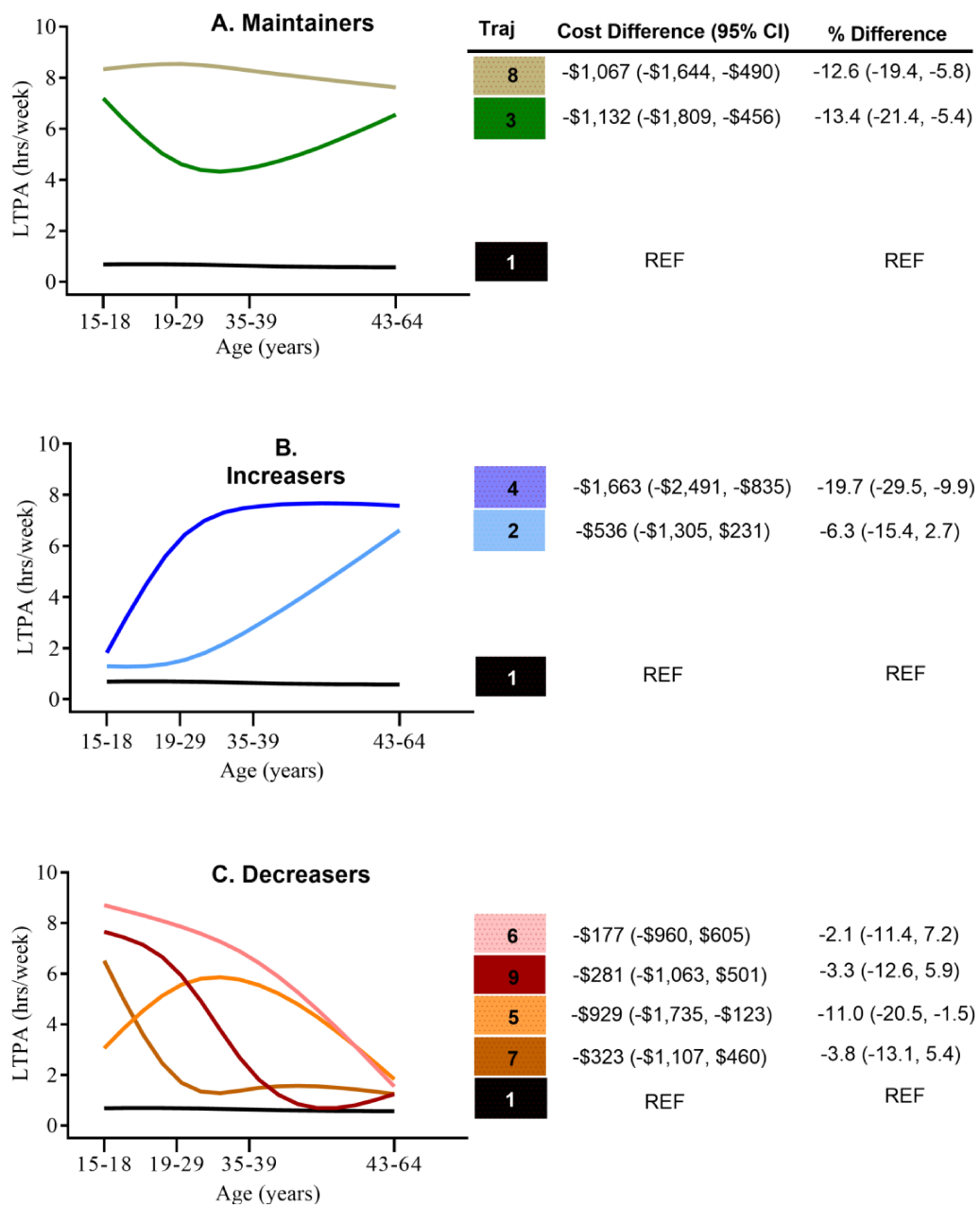


Figure S3: Association between leisure-time physical activity (LTPA) trajectory and average annual healthcare cost in later life in 1999 to 2008 (Model 2)