**Web Appendix:**

Renehan et al.

**Body Mass Index at Different Adult Ages, Weight Change and Colorectal Cancer Risk in the NIH-AARP Cohort**

## Exclusions

A sub-cohort of 324,524 satisfactorily completed the baseline questionnaire and an additional risk factor questionnaire (RFQ) mailed in 1996, which included recalled weights at ages 18, 35, and 50 years. We excluded records for the following: persons with self-reported cancer on the RFQ (n=14,565); persons with missing values for baseline weight (n=5,903), weight at age 18 years (n=17,933), weight at age 35 years (n=3,044), weight at age 50 years (n=1,998), or height (n=394); and persons with extreme values for baseline weight (n=436), weight at age 18 years (1,327), weight at age 35 years (2,325), weight at age 50 years (n=1,762), or height (n=1,158) based on the Box-Cox transformation. After exclusions, the analytic cohort comprised 273,679 participants (168,294 men; 105,385 women).

| | Description | N-men | Filter-men | N-women | Filter-wome | Total-N | Total-Filter |
|---|---|---|---|---|---|---|---|
| 2 | Original dataset | | | | | **566401** | |
| 3 | Sex exclusion | 339669 | -226732 | 226732 | -339669 | 566401 | -566401 |
| 4 | Returned second QX (rf_entry_dt not missing) | 196851 | -142818 | 138056 | -88676 | 334907 | -231494 |
| 5 | Returned second QX (rf_personyrs not missing). | 196851 | 0 | 138056 | 0 | 334907 | 0 |
| 6 | Proxy (Box B) exclusion | 190373 | -6478 | 137575 | -481 | 327948 | -6959 |
| 7 | RFQ Proxy (RFQ Box B) exclusion | 188117 | -2256 | 136407 | -1168 | 324524 | -3424 |
| 8 | Any cancer dx before RFQ entry | 180721 | -7396 | 129238 | -7169 | 309959 | -14565 |
| 9 | Self-reported other cancer on Baseline Qx | 188117 | 0 | 129238 | 0 | 317355 | 0 |
| 10 | Deleting missings on weight at entry | 178222 | -2499 | 125834 | -3404 | 304056 | -5903 |
| 11 | Deleting missings on weight at age 18 | 173857 | -4365 | 112266 | -13568 | 286123 | -17933 |
| 12 | Deleting missings on weight at age 35 | 172609 | -1248 | 110470 | -1796 | 283079 | -3044 |
| 13 | Deleting missings on weight at age 50 | 171736 | -873 | 109345 | -1125 | 281081 | -1998 |
| 14 | Deleting missings on height | 171503 | -233 | 109184 | -161 | 280687 | -394 |
| 15 | Deleting outliers on weight at entry | 171291 | -212 | 108960 | -224 | 280251 | -436 |
| 16 | Deleting outliers on weight at age 18 | 170736 | -555 | 108188 | -772 | 278924 | -1327 |
| 17 | Deleting outliers on weight at age 35 | 169959 | -777 | 106640 | -1548 | 276599 | -2325 |
| 18 | Deleting outliers on weight at age 50 | 169076 | -883 | 105761 | -879 | 274837 | -1762 |
| 19 | Deleting outliers on height | **168294** | -782 | **105385** | -376 | **273679** | -1158 |
| 20 | | | | | | | |

**Cohort follow-up**

NIH-AARP cohort members were followed annually for change of address: through matching to the National Change of Address maintained by the U.S. Postal Service; through receipt of U.S. Postal Service processing of undeliverable mail; from other address change update services; and directly from participants in response to study mailings. Vital status was ascertained by: annual linkage to the Social Security Administration Death Master File (SSADMF) on deaths in the U.S.; follow-up searches of the National Death Index for individuals who matched to the SSADMF; cancer registry linkage; questionnaire responses; and responses to other mailings.

**Identification of cases**

Incident colon and rectal cancers were identified through the eight state cancer registries, linked by name, address, sex, date of birth, and if available, and Social Security number. Beyond the eight original states of our cohort, the cancer registry ascertainment area included two additional states (TX, and AZ) to capture cancers occurring among participants who relocated to those states during follow-up. It is estimated that approximately 90% of cancer cases were validly identified (1).

1. Michaud DS, Midthune D, Hermansen S. Comparison of cancer registry case ascertainment with SEER estimates and self-reporting in a subset of the NIH-AARP Diet and Health Study. *J Registry Manage* 2005;32:70-5

**Web Table 1 Baseline characteristics of AARP Diet and Health Study cohort by category of BMI at baseline**

| | BMI category (kg/m$^2$) at cohort entry | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **<18.5** | **18.5 – 21.9** | **22 – 22.9** | **23 - 24.9** | **25 - 27.4** | **27.5 - 29.9** | **30 - 32.4** | **32.5 - 34.9** | **≥ 35** |
| **MEN** | | | | | | | | | |
| N | 665 | 9,201 | 9,588 | 31,708 | 50,825 | 32,164 | 17,897 | 8,912 | 7,334 |
| Age at baseline | 63.5 | 63.0 | 62.9 | 62.8 | 62.6 | 62.3 | 62.0 | 61.7 | 61.1 |
| BMI at baseline (kg/m$^2$) | 17.2 | 21.0 | 22.6 | 24.0 | 26.2 | 28.7 | 31.1 | 33.6 | 38.3 |
| Smoking - never (%) | 32.2 | 35.3 | 35.8 | 33.6 | 29.8 | 26.9 | 25.8 | 24.8 | 24.8 |
| Smoking - past (%) | 44.8 | 44.4 | 48.5 | 52.5 | 58.0 | 61.7 | 63.1 | 63.9 | 64.8 |
| Smoking - current (%) | 20.5 | 17.2 | 12.5 | 10.7 | 8.8 | 7.9 | 7.6 | 7.6 | 6.5 |
| Ethnicity (% White) | 92.7 | 93.3 | 94.5 | 94.8 | 94.8 | 95.3 | 94.9 | 95.0 | 94.8 |
| More than HS education (%) | 83.2 | 84.2 | 84.7 | 84.1 | 81.2 | 79.4 | 77.5 | 76.1 | 74.4 |
| Physically active (%) | 47.1 | 57.6 | 60.6 | 58.9 | 54.3 | 49.1 | 43.5 | 38.9 | 29.9 |
| Energy (kcal/day) | 2,041 | 2,037 | 1,982 | 1,984 | 1,997 | 2,043 | 2,088 | 2,148 | 2,236 |
| Alcohol (g/day) | 18.6 | 18.4 | 17.6 | 18.2 | 18.2 | 18.6 | 18.3 | 17.8 | 15.5 |
| Fat (g/1000 kcal/day) | 33.7 | 31.8 | 31.7 | 32.1 | 33.2 | 34.2 | 35.0 | 35.9 | 36.8 |
| Red meat (g/1000 kcal/day) | 34.7 | 30.5 | 31.1 | 33.1 | 36.6 | 39.9 | 42.4 | 44.6 | 47.5 |
| Vegetables (servings/1000 kcal/day) | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Fruit (servings/1000 kcal/day) | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 |
| **WOMEN** | | | | | | | | | |
| N | 1,263 | 18,092 | 8,434 | 19,538 | 21,690 | 12,845 | 9,490 | 5,845 | 8,188 |
| Age at baseline | 62.6 | 61.8 | 61.9 | 62.1 | 62.2 | 62.1 | 62.0 | 61.8 | 61.1 |
| BMI at baseline (kg/m$^2$) | 17.5 | 20.7 | 22.5 | 24.0 | 26.3 | 28.8 | 31.2 | 33.7 | 39.4 |
| Smoking - never (%) | 37.8 | 42.5 | 42.9 | 43.6 | 43.0 | 45.4 | 45.9 | 46.2 | 46.0 |
| Smoking - past (%) | 28.7 | 36.5 | 39.3 | 39.4 | 41.0 | 40.4 | 41.6 | 41.6 | 43.8 |
| Smoking - current (%) | 30.4 | 18.2 | 14.6 | 14.1 | 12.9 | 11.6 | 9.8 | 9.4 | 7.3 |
| Ethnicity (% White) | 95.4 | 95.9 | 95.5 | 94.6 | 92.6 | 92.0 | 91.0 | 90.5 | 89.9 |
| More than HS education (%) | 77.6 | 77.5 | 76.4 | 72.3 | 70.5 | 68.0 | 67.5 | 66.1 | 65.1 |
| MHT use (% ever used) | 53.7 | 61.2 | 61.0 | 59.7 | 55.9 | 53.2 | 49.7 | 45.7 | 40.1 |
| Physically active (%) | 47.3 | 54.3 | 53.0 | 49.7 | 45 | 37.7 | 33.9 | 30.5 | 22.4 |
| Energy (kcal/day) | 1,618 | 1,535 | 1,524 | 1,531 | 1,552 | 1,600 | 1,616 | 1,641 | 1,739 |
| Alcohol (g/day) | 8.7 | 8.3 | 7.9 | 7.4 | 6.3 | 5.2 | 4.6 | 3.8 | 3.1 |
| Fat (g/1000 kcal/day) | 33.0 | 31.5 | 31.7 | 32.2 | 32.9 | 33.8 | 34.4 | 35.0 | 36.2 |
| Red meat (g/1000 kcal/day) | 25.2 | 24.3 | 25.5 | 27.6 | 29.3 | 31.2 | 32.3 | 33.5 | 35.9 |
| Vegetables (servings/1000 kcal/day) | 2.5 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 |
| Fruit (servings/1000 kcal/day) | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 |

All values (except age) were directly standardized to the age distribution of the cohort. BMI: body mass index. HS: High-school. MHT: Menopausal hormonal therapy.

**Web Table 2 Pearson correlation coefficients for BMI values and weight change values at different ages**

| | | | | | Weight change | | | |
|---|---|---|---|---|---|---|---|---|
| | BMI 18 | BMI 35 | BMI 50 | baseline BMI | 18-35 | 35-50 | 50-baseline | 18-baseline |
| MEN | | | | | | | | |
| BMI 18 | 1.00 | | | | | | | |
| BMI 35 | 0.67 | 1.00 | | | | | | |
| BMI 50 | 0.49 | 0.75 | 1.00 | | | | | |
| BMI baseline | 0.37 | 0.58 | 0.81 | 1.00 | | | | |
| Wt Chg 18-35 | -0.37 | 0.43 | 0.34 | 0.26 | 1.00 | | | |
| Wt Chg 35-50 | -0.17 | -0.22 | 0.48 | 0.43 | -0.07 | 1.00 | | |
| Wt Chg 50-baseline | -0.06 | -0.09 | -0.10 | 0.35 | -0.03 | -0.03 | 1.00 | |
| Wt Chg 18-baseline | -0.37 | 0.08 | 0.45 | 0.69 | 0.56 | 0.56 | 0.41 | 1.00 |
| WOMEN | | | | | | | | |
| BMI 18 | 1.00 | | | | | | | |
| BMI 35 | 0.59 | 1.00 | | | | | | |
| BMI 50 | 0.42 | 0.74 | 1.00 | | | | | |
| BMI baseline | 0.34 | 0.63 | 0.82 | 1.00 | | | | |
| Wt Chg 18-35 | -0.34 | 0.55 | 0.43 | 0.38 | 1.00 | | | |
| Wt Chg 35-50 | -0.01 | 0.04 | 0.70 | 0.55 | 0.07 | 1.00 | | |
| Wt Chg 50-baseline | 0.00 | 0.04 | 0.00 | 0.41 | 0.05 | -0.04 | 1.00 | |
| Wt Chg 18-baseline | -0.18 | 0.33 | 0.64 | 0.84 | 0.58 | 0.62 | 0.46 | 1.00 |

Wt chg: weight change

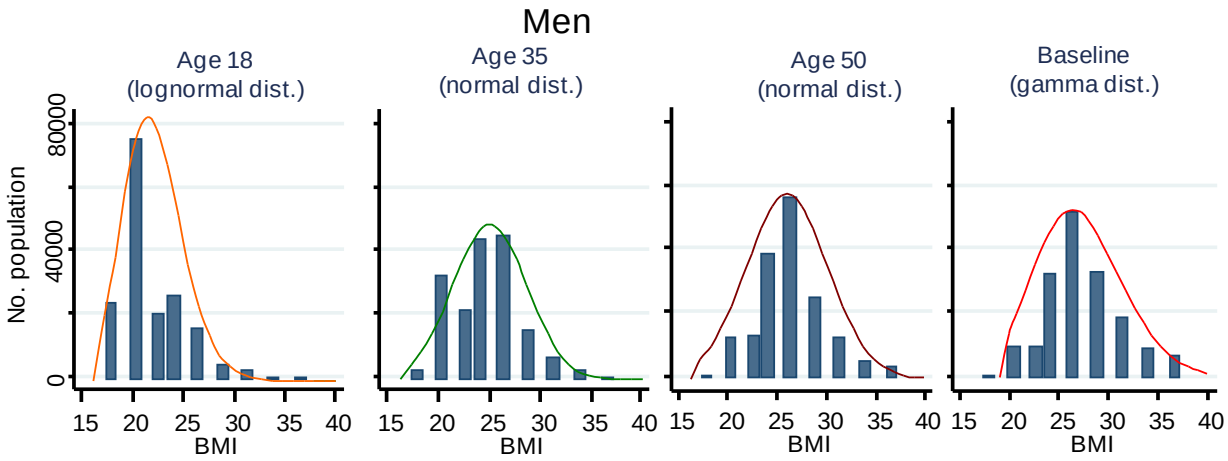
The correlation coefficients between baseline BMI and BMI at ages 50, 35 and 18 years were 0.81, 0.58 and 0.37 in men, and 0.82, 0.63 and 0.34 in women. Baseline BMI was positively correlated with weight gain since age 18 years (r = 0.69) in men and (r = 0.84) in women.

**Web Table 3 Baseline characteristics of AARP Diet and Health Study cohort by weight gain categories**

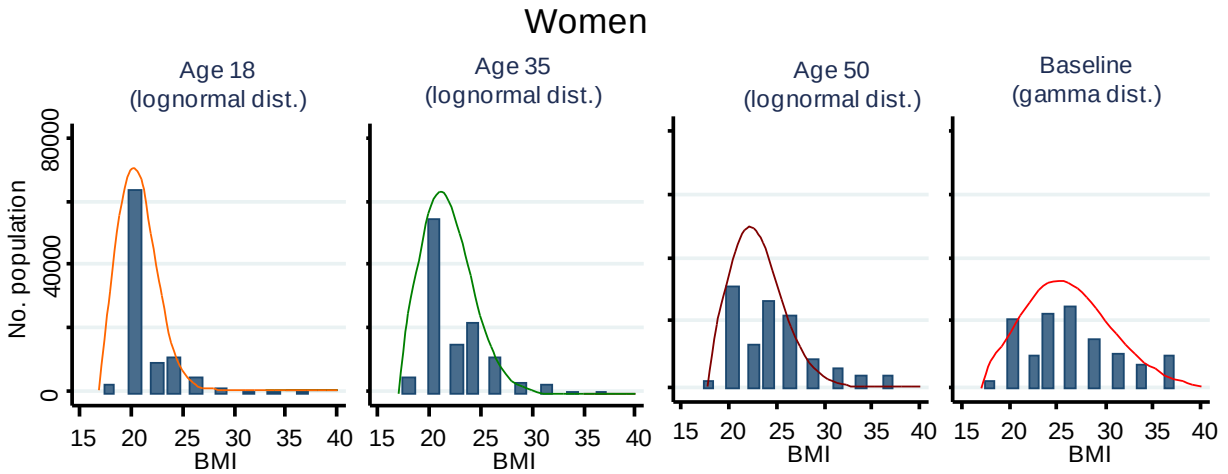
| | Weight change from age 18 to age at baseline (kg/yr) | | | | |
|---|---|---|---|---|---|
| | **Loss ≤-0.50 kg/yr** | **Stable >(-0.50) – (+0.50) kg/yr** | **Gain >0.50 - 1.00 kg/yr** | **Gain >1.00-2.00 kg/yr** | **Gain >2 kg/yr** |
| **MEN** | | | | | |
| N | 383 | 112,946 | 48,123 | 6,707 | 135 |
| Age at baseline | 60.1 | 63.1 | 61.3 | 58.8 | 56.1 |
| BMI at baseline (kg/m$^2$) | 23.6 | 25.6 | 29.7 | 36.5 | 43.1 |
| BMI at age 18 (kg/m$^2$) | 32.8 | 22.2 | 20.4 | 20.2 | 16.0 |
| BMI at age 35 (kg/m$^2$) | 27.6 | 24.4 | 24.7 | 26.3 | 24.4 |
| BMI at age 50 (kg/m$^2$) | 26.6 | 25.3 | 27.5 | 31.4 | 36.4 |
| Weight change at age 18-35 (kg) | -16.5 | 7.1 | 13.7 | 20.0 | 29.2 |
| Weight change at age 35-50 (kg) | -3.1 | 2.8 | 9.1 | 16.6 | 41.9 |
| Weight change at age 50-baseline (kg) | -9.9 | 1.0 | 6.9 | 16.5 | 21.6 |
| Weight change at age 18-baseline (kg) | -29.5 | 10.8 | 29.7 | 53.1 | 92.7 |
| Smoking - never (%) | 26.1 | 31.9 | 25.5 | 22.8 | 14.0 |
| Smoking - past (%) | 55.8 | 54.3 | 63.5 | 67.3 | 75.6 |
| Smoking - current (%) | 14.1 | 10.5 | 7.5 | 6.2 | 6.7 |
| Ethnicity (% White) | 97.3 | 94.9 | 94.8 | 93.9 | 94.5 |
| More than HS education (%) | 81.6 | 82.7 | 77.5 | 72.5 | 48.1 |
| Physically active (%) | 58.4 | 56.5 | 43.3 | 28.7 | 8.9 |
| Energy (kcal/day) | 1,851 | 1,989 | 2,097 | 2,309 | 2,085 |
| Alcohol (g/day) | 14.1 | 17.9 | 18.9 | 17.4 | 12.6 |
| Fat (g/1000 kcal/day) | 32.1 | 32.7 | 34.9 | 36.7 | 35.1 |
| Red meat (g/1000 kcal/day) | 33.5 | 35.1 | 41.7 | 46.7 | 51.8 |
| Vegetables (servings/1000 kcal/day) | 2.3 | 2.1 | 2.0 | 2.0 | 1.8 |
| Fruit (servings/1000 kcal/day) | 1.8 | 1.6 | 1.5 | 1.4 | 1.7 |
| **WOMEN** | | | | | |
| N | 184 | 75,952 | 24,404 | 4,758 | 87 |
| Age at baseline | 60.3 | 62.5 | 60.9 | 58.7 | 55.8 |
| BMI at baseline (kg/m$^2$) | 20.3 | 24.4 | 31.4 | 40.6 | 55.9 |
| BMI at age 18 (kg/m$^2$) | 30.5 | 20.9 | 20.5 | 21.1 | 20.7 |
| BMI at age 35 (kg/m$^2$) | 23.9 | 22.1 | 23.7 | 26.1 | 26.1 |
| BMI at age 50 (kg/m$^2$) | 23.7 | 23.4 | 27.6 | 33.1 | 34.9 |
| Weight change at age 18-35 (kg) | -17.7 | 3.0 | 8.7 | 13.5 | 14.7 |
| Weight change at age 35-50 (kg) | -0.2 | 3.6 | 10.6 | 19.1 | 23.7 |
| Weight change at age 50-baseline (kg) | -9.3 | 2.5 | 10.3 | 20.5 | 54.4 |
| Weight change at age 18-baseline (kg) | -27.2 | 9.1 | 29.6 | 53.1 | 92.8 |
| Smoking - never (%) | 34.9 | 43.3 | 45.7 | 45.7 | 51.4 |
| Smoking - past (%) | 37.5 | 39.0 | 41.8 | 44.4 | 43.1 |
| Smoking - current (%) | 23.6 | 14.8 | 9.7 | 6.8 | 4.4 |
| Ethnicity (% White) | 93.7 | 94.5 | 90.8 | 87.9 | 77.3 |
| More than HS education (%) | 72.4 | 73.1 | 67.0 | 65.0 | 45.7 |
| MHT use (% ever used) | 51.9 | 57.8 | 49.7 | 40.2 | 34.7 |
| Physically active (%) | 47.9 | 48.7 | 32.4 | 20.5 | 22.1 |
| Energy (kcal/day) | 1,414 | 1,536 | 1,645 | 1,818 | 2,115 |
| Alcohol (g/day) | 7.1 | 7.0 | 4.7 | 3.2 | 3.2 |
| Fat (g/1000 kcal/day) | 31.5 | 32.3 | 34.8 | 36.3 | 36.1 |
| Red meat (g/1000 kcal/day) | 26.8 | 27.3 | 32.9 | 36.4 | 32.7 |
| Vegetables (servings/1000 kcal/day) | 3.0 | 2.5 | 2.4 | 2.4 | 2.4 |
| Fruit (servings/1000 kcal/day) | 2.1 | 2.0 | 1.8 | 1.8 | 2.0 |

All values (except age) were directly standardized to the age distribution of the cohort. BMI: body mass index. HS: High-school. MHT: Menopausal hormonal therapy.

**Web Figure 1 BMI distributions at different ages by men and women**



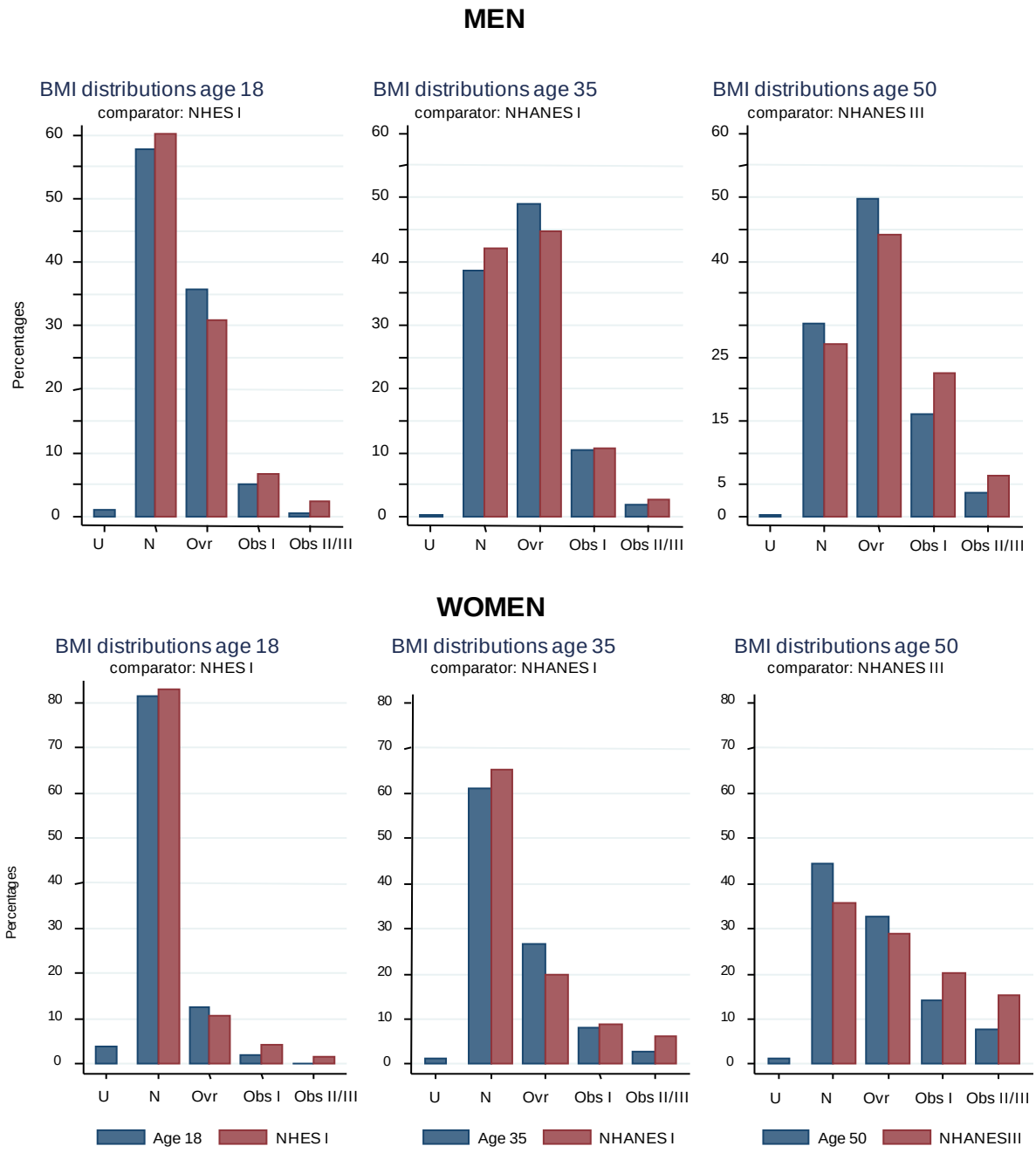

| BMI categories (kg/m$^2$) | N | N | N | N |
|---|---|---|---|---|
| < 18.5 | 24,109 | 1,873 | 466 | 380 |
| 18.5 – 21.9 | 75,406 | 31,700 | 11,879 | 9,402 |
| 21.9 – 22.9 | 20,039 | 21,015 | 13,521 | 9.897 |
| 23.0 – 24.9 | 25,285 | 43,527 | 38,801 | 32,720 |
| 25.0 – 27.4 | 15,603 | 44,500 | 56,387 | 52,241 |
| 27.5 – 29.9 | 3,984 | 14,887 | 25,058 | 32,989 |
| 30.0 – 32.4 | 1,523 | 6,282 | 12,117 | 18,363 |
| 32.5 – 34.9 | 409 | 1,953 | 5,415 | 9,113 |
| ≥ 35 | 103 | 624 | 2,942 | 6,606 |
| Mean (kg/m$^2$) | 21.5 | 24.5 | 26.1 | 27.1 |




| BMI categories (kg/m$^2$) | N | N | N | N |
|---|---|---|---|---|
| < 18.5 | 17,705 | 4,598 | 1,682 | 1,508 |
| 18.5 – 21.9 | 63,233 | 55,054 | 30,857 | 21,435 |
| 21.9 – 22.9 | 9,301 | 15,206 | 13,194 | 9,873 |
| 23.0 – 24.9 | 10,727 | 22,168 | 26,820 | 22,981 |
| 25.0 – 27.4 | 4,702 | 10,867 | 21,906 | 25,155 |
| 27.5 – 29.9 | 1,231 | 3,177 | 8,853 | 14,824 |
| 30.0 – 32.4 | 531 | 1,643 | 5,984 | 10,760 |
| 32.5 – 34.9 | 90 | 519 | 3,268 | 6,674 |
| ≥ 35 | 16 | 91 | 3,300 | 9,353 |
| Mean (kg/m$^2$) | 20.7 | 22.4 | 24.7 | 26.5 |

**Web Figure 2 Validation of recall approach to BMI determination at earlier ages. Comparisons with contemporaneous populations.**

To test for the validity of the recall approach to determining BMI at younger ages, we evaluated these age-specific BMI distributions by sex against contemporaneous populations. We estimated that for a cohort with a median age of approximately 60 years collected in the mid-1990s, approximate populations for their BMIs at age 18 was NHES I (1960-62); at age 35 was NHANES I (1971 to 1974): and at age 50 was NHANES III (1988-94). The respective comparators for men and women are illustrated below. There was broad agreement for the numerically larger groups of normal weight (N) and overweight (Ovr). NHANES I and III tended to report high prevalences for obesity classes I, II, and III (Obs I and Obs II/III). NHANES did not report underweight (U). (Source: Flegal KM, Carroll MD, Kuczmarski RJ, et al. Overweight and obesity in the United States: prevalence and trends, 1960-1994. *Int J Obes Relat Metab Disord* 1998;22(1):39-47).



**Web Table 4 Relative risk of incident colorectal cancer in relation to Body Mass Index (BMI) at baseline age, 50, 35, and18 years among men and women the AARP Diet and Health Study cohort.[1]**

| | BMI category (kg/m$^2$) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | <18.5 | 18.5 - 20.9 | 21 - 22.9 | 23 - 24.9 | 25 - 27.4 | 27.5 - 29.9 | 30 - 32.4 (≥30) | 32.5 - 34.9 (≥32.5) | ≥ 35 | Hazard ratio per 5 kg/m$^2$ | P for trend[2] |
| MEN | | | | | | | | | | | |
| **BMI at baseline** | | | | | | | | | | | |
| Cases | 10 | 134 | 136 | 493 | 804 | 584 | 325 | 167 | 151 | | |
| MV HR | 1.09 | 1.0 | 0.99 | 1.06 | 1.07 | 1.24 | 1.21 | 1.31 | 1.50 | 1.14 | <.0001 |
| (95% CI) | (0.57-2.08) | Ref. | (0.77-1.26) | (0.87-1.29) | (0.88-1.29) | (1.02-1.5) | (0.98-1.5) | (1.04-1.66) | (1.18-1.91) | (1.08-1.20) | |
| **BMI at 50 years** | | | | | | | | | | | |
| Cases | 15 | 197 | 214 | 583 | 956 | 423 | 232 | 114 | 70 | | |
| MV HR | 1.25 | 1.0 | 0.97 | 0.95 | 1.05 | 1.12 | 1.28 | 1.43 | 1.27 | 1.15 | <.0001 |
| (95% CI) | (0.74-2.11) | Ref. | (0.79-1.18) | (0.80-1.12) | (0.90-1.23) | (0.94-1.33) | (1.05-1.56) | (1.13-1.81) | (0.96-1.69) | (1.09-1.22) | |
| **BMI at 35 years** | | | | | | | | | | | |
| Cases | 36 | 541 | 339 | 702 | 712 | 286 | 113 | 75 | | | |
| MV HR | 1.03 | 1.0 | 0.98 | 1.00 | 1.02 | 1.26 | 1.20 | 1.49 | | 1.14 | <.0001 |
| (95% CI) | (0.74-1.45) | Ref. | (0.86-1.13) | (0.89-1.12) | (0.91-1.14) | (1.08-1.46) | (0.97-1.47) | (1.16-1.91) | | (1.07-1.22) | |
| **BMI at 18 years** | | | | | | | | | | | |
| Cases | 441 | 1255 | 334 | 415 | 242 | 60 | 57 | | | | |
| MV HR[1] | 1.08 | 1.0 | 1.04 | 1.05 | 1.00 | 1.02 | 1.50 | | | 1.08 | 0.07 |
| (95% CI) | (0.97-1.21) | Ref. | (0.92-1.17) | (0.94-1.18) | (0.87-1.15) | (0.79-1.33) | (1.15-1.97) | | | (0.99-1.17) | |
| WOMEN | | | | | | | | | | | |
| **BMI at baseline** | | | | | | | | | | | |
| Cases | 20 | 191 | 90 | 225 | 269 | 159 | 101 | 74 | 111 | | |
| MV HR | 1.46 | 1.0 | 1.03 | 1.08 | 1.12 | 1.12 | 0.96 | 1.16 | 1.25 | 1.05 | 0.13 |
| (95% CI) | (0.92-2.32) | Ref. | (0.80-1.33) | (0.89-1.31) | (0.93-1.36) | (0.90-1.39) | (0.75-1.23) | (0.88-1.53) | (0.97-1.60) | (0.99-1.11) | |
| **BMI at 50 years** | | | | | | | | | | | |
| Cases | 20 | 299 | 126 | 301 | 251 | 87 | 63 | 36 | 57 | | |
| MV HR | 1.23 | 1.0 | 0.96 | 1.09 | 1.13 | 0.97 | 1.10 | 1.21 | 1.58 | 1.10 | 0.01 |
| (95% CI) | (0.78-1.94) | Ref. | (0.78-1.19) | (0.92-1.28) | (0.95-1.34) | (0.75-1.24) | (0.83-1.46) | (0.85-1.72) | (1.18-2.12) | (1.03-1.18) | |
| **BMI at 35 years** | | | | | | | | | | | |
| Cases | 43 | 551 | 177 | 238 | 132 | 45 | 26 | 28 | | | |
| MV HR | 1.04 | 1.0 | 1.10 | 1.00 | 1.08 | 1.30 | 1.16 | 1.67 | | 1.14 | 0.01 |
| (95% CI) | (0.76-1.43) | Ref. | (0.93-1.3) | (0.85-1.16) | (0.88-1.31) | (0.96-1.77) | (0.77-1.73) | (1.13-2.47) | | (1.03-1.25) | |
| **BMI at 18 years** | | | | | | | | | | | |
| Cases | 199 | 719 | 110 | 110 | 63 | 20 | 19 | | | | |
| MV HR | 1 | 1.0 | 1.03 | 0.85 | 1.13 | 1.31 | 1.29 | | | 1.07 | 0.34 |
| (95% CI) | (0.85-1.17) | Ref. | (0.84-1.26) | (0.69-1.04) | (0.87-1.47) | (0.84-2.05) | (0.81-2.06) | | | (0.93-1.22) | |

[1]Multivariable hazard ratios (MV HR) calculated using PROC PHREG in SAS version 9.1. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, and alcohol consumption. Analyses for women also adjusted for use of menopausal hormone therapy.

**Web Table 5 Hazard ratios for incident proximal and distal colon cancer in relation to Body Mass Index (BMI) at baseline age, 50, 35, 18 years among men in the AARP Diet and Health Study cohort**

| | BMI category (kg/m$^2$) | | | | | | | | | Hazard Ratio[2] per 5 kg/ m$^2$ | P for trend[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **<18.5** | **18.5 - 21.9** | **22 - 22.9** | **23 - 24.9** | **25 - 27.4** | **27.5 - 29.9** | **30 - 32.4 (≥30)[3]** | **32.5 - 34.9 (≥32.5)[3]** | **≥ 35** | | |
| **BMI at baseline** | | | | | | | | | | | |
| Proximal Colon cases | 5 | 59 | 54 | 193 | 314 | 253 | 129 | 72 | 66 | | |
| MV HR[1] | 1.24 | 1.0 | 0.88 | 0.93 | 0.97 | 1.23 | 1.14 | 1.36 | 1.57 | 1.20 | <.0001 |
| (95% CI) | (0.50-3.09) | Ref. | (0.60-1.28) | (0.69-1.25) | (0.73-1.29) | (0.92-1.65) | (0.83-1.57) | (0.95-1.93) | (1.09-2.25) | (1.11-1.30) | |
| Distal Colon cases | 1 | 33 | 35 | 145 | 267 | 171 | 113 | 46 | 44 | | |
| MV HR[1] | 0.44 | 1.0 | 1.02 | 1.25 | 1.36 | 1.44 | 1.69 | 1.37 | 1.68 | 1.15 | 0.003 |
| (95% CI) | (0.06-3.22) | Ref. | (0.62-1.66) | (0.84-1.85) | (0.94-1.99) | (0.98-2.12) | (1.13-2.52) | (0.86-2.18) | (1.05-2.68) | (1.05-1.27) | |
| **BMI at 50 years** | | | | | | | | | | | |
| Proximal Colon cases | 6 | 85 | 89 | 234 | 386 | 174 | 91 | 50 | 30 | | |
| MV HR[1] | 1.15 | 1.0 | 0.93 | 0.87 | 1.00 | 1.09 | 1.21 | 1.52 | 1.27 | 1.17 | 0.0003 |
| (95% CI) | (0.50-2.64) | Ref. | (0.69-1.26) | (0.68-1.12) | (0.78-1.27) | (0.83-1.42) | (0.90-1.64) | (1.07-2.17) | (0.82- 1.97) | (1.08-1.28) | |
| Distal Colon cases | 5 | 52 | 67 | 165 | 302 | 130 | 79 | 39 | 16 | | |
| MV HR[1] | 1.54 | 1.0 | 1.14 | 0.97 | 1.21 | 1.24 | 1.57 | 1.81 | 1.04 | 1.18 | 0.002 |
| (95% CI) | (0.62-3.88) | Ref. | (0.79-1.66) | (0.70-1.34) | (0.90-1.65) | (0.89-1.73) | (1.09-2.25) | (1.19-2.77) | (0.58-1.86) | (1.06-1.30) | |
| **BMI at 35 years** | | | | | | | | | | | |
| Proximal Colon cases | 17 | 221 | 137 | 289 | 283 | 122 | 45 | 31 | | | |
| MV HR[1] | 1.18 | 1.0 | 0.97 | 1.00 | 0.98 | 1.33 | 1.15 | 1.49 | | 1.14 | 0.01 |
| (95% CI) | (0.72-1.93) | Ref. | (0.78-1.21) | (0.83-1.19) | (0.82-1.17) | (1.06-1.67) | (0.83-1.59) | (1.01- 2.20) | | (1.03-1.26) | |
| Distal Colon cases | 9 | 155 | 113 | 203 | 232 | 86 | 38 | 19 | | | |
| MV HR[1] | 0.91 | 1.0 | 1.12 | 0.99 | 1.17 | 1.33 | 1.41 | 1.29 | | 1.17 | 0.01 |
| (95% CI) | (0.47-1.79) | Ref. | (0.87-1.45) | (0.80-1.24) | (0.95-1.45) | (1.01-1.74) | (0.98-2.03) | (0.79-2.11) | | (1.04-1.31) | |
| **BMI at 18 years** | | | | | | | | | | | |
| Proximal Colon cases | 185 | 514 | 137 | 173 | 91 | 26 | 19 | | | | |
| MV HR[1] | 1.11 | 1.0 | 1.03 | 1.07 | 0.90 | 1.08 | 1.25 | | | 1.02 | 0.72 |
| (95% CI) | (0.94- 1.32) | Ref. | (0.85-1.25) | (0.90-1.27) | (0.72-1.14) | (0.73-1.61) | (0.79-1.98) | | | (0.90-1.17) | |
| Distal Colon cases | 130 | 373 | 98 | 136 | 80 | 20 | 18 | | | | |
| MV HR[1] | 1.06 | 1.0 | 1.05 | 1.20 | 1.14 | 1.17 | 1.65 | | | 1.18 | 0.02 |
| (95% CI) | (0.86-1.30) | Ref. | (0.83-1.32) | (0.98-1.46) | (0.89-1.46) | (0.75-1.84) | (1.02-2.65) | | | (1.02-1.36) | |

[1] Multivariable hazard ratios (MV HR) calculated using PROC PHREG in SAS version 9.1. We took relative risk (RR) – used in the text – to be equivalent with HR. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, and alcohol consumption.
[2] Calculated after excluding subjects whose BMI at a given age was less than 18.5 kg/m$^2$.
[3] Collapsed BMI categories. There were 28 men with synchronous colon and rectal cancers. There was missing location data for proximal and distal colon cancers in 70 men.

**Web Table 6 Hazard ratios for incident proximal and distal colon cancer in relation to Body Mass Index (BMI) at baseline age, 50, 35, 18 years among women in the AARP Diet and Health Study cohort**

| | BMI category (kg/m$^2$) | | | | | | | | | Hazard Ratio[2] per 5 kg/ m$^2$ | P for trend[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **<18.5** | **18.5 - 21.9** | **22 - 22.9** | **23 - 24.9** | **25 - 27.4** | **27.5 - 29.9** | **30 - 32.4 (≥30)[3]** | **32.5 - 34.9 (≥32.5)[3]** | **≥ 35** | | |
| **BMI at baseline** | | | | | | | | | | | |
| Proximal Colon cases | 12 | 102 | 40 | 109 | 128 | 80 | 52 | 27 | 57 | | |
| MV HR[1] | 1.59 | 1.0 | 0.85 | 0.98 | 0.99 | 1.04 | 0.92 | 0.75 | 1.15 | 1.02 | 0.67 |
| (95% CI) | (0.88-2.90) | Ref. | (0.59-1.23) | (0.74-1.28) | (0.76-1.29) | (0.77-1.40) | (0.65-1.29) | (0.49-1.17) | (0.82-1.63) | (0.93-1.11) | |
| Distal Colon cases | 1 | 43 | 28 | 64 | 69 | 45 | 29 | 24 | 26 | | |
| MV HR[1] | 0.36 | 1.0 | 1.45 | 1.36 | 1.28 | 1.45 | 1.28 | 1.72 | 1.35 | 1.07 | 0.23 |
| (95% CI) | (0.05-2.61) | Ref. | (0.89-2.37) | (0.91-2.04) | (0.86-1.91) | (0.94-2.24) | (0.79-2.08) | (1.02-2.88) | (0.81-2.25) | (0.96-1.20) | |
| **BMI at 50 years** | | | | | | | | | | | |
| Proximal Colon cases | 14 | 139 | 67 | 145 | 122 | 43 | 35 | 16 | 26 | | |
| MV HR[1] | 1.84 | 1.0 | 1.1 | 1.13 | 1.21 | 1.05 | 1.35 | 1.14 | 1.64 | 1.12 | 0.03 |
| (95% CI) | (1.06-3.19) | Ref. | (0.82-1.48) | (0.90-1.44) | (0.94-1.55) | (0.74-1.50) | (0.92-1.97) | (0.66-1.95) | (1.06-2.52) | (1.01-1.24) | |
| Distal Colon cases | 3 | 77 | 31 | 84 | 66 | 26 | 16 | 7 | 19 | | |
| MV HR[1] | 0.75 | 1.0 | 0.91 | 1.17 | 1.11 | 1.17 | 1.1 | 0.91 | 1.85 | 1.13 | 0.08 |
| (95% CI) | (0.24-2.37) | Ref. | (0.60-1.40) | (0.85-1.61) | (0.79-1.56) | (0.75-1.85) | (0.64-1.91) | (0.42-1.99) | (1.09-3.16) | (0.99-1.29) | |
| **BMI at 35 years** | | | | | | | | | | | |
| Proximal Colon cases | 18 | 265 | 89 | 120 | 66 | 28 | 13 | 8 | | | |
| MV HR[1] | 0.94 | 1.0 | 1.14 | 1.05 | 1.14 | 1.69 | 1.25 | 1.05 | | 1.13 | 0.08 |
| (95% CI) | (0.59-1.52) | Ref. | (0.90-1.46) | (0.85-1.31) | (0.86-1.5) | (1.14-2.51) | (0.72-2.2) | (0.52-2.14) | | (0.98-1.31) | |
| Distal Colon cases | 10 | 143 | 49 | 65 | 36 | 8 | 8 | 10 | | | |
| MV HR[1] | 0.81 | 1.0 | 1.17 | 1.05 | 1.13 | 0.88 | 1.4 | 2.05 | | 1.16 | 0.11 |
| (95% CI) | (0.40-1.65) | Ref. | (0.84-1.62) | (0.78-1.42) | (0.77-1.65) | (0.43-1.79) | (0.68-2.86) | (1.04-4.05) | | (0.96-1.41) | |
| **BMI at 18 years** | | | | | | | | | | | |
| Proximal Colon cases | 89 | 350 | 59 | 57 | 37 | 9 | 6 | | | | |
| MV HR[1] | 0.90 | 1.0 | 1.12 | 0.92 | 1.39 | 1.2 | 0.89 | | | 1.08 | 0.39 |
| (95% CI) | (0.71-1.14) | Ref. | (0.85-1.48) | (0.69-1.22) | (0.99-1.96) | (0.62-2.32) | (0.39-1.99) | | | (0.90-1.30) | |
| Distal Colon cases | 57 | 187 | 26 | 28 | 13 | 8 | 10 | | | | |
| MV HR[1] | 1.11 | 1.0 | 0.97 | 0.82 | 0.86 | 2.05 | 2.43 | | | 1.22 | 0.10 |
| (95% CI) | (0.82-1.50) | Ref. | (0.64-1.47) | (0.54-1.23) | (0.48-1.54) | (1.01-4.17) | (1.24-4.76) | | | (0.96-1.55) | |

[1] Multivariable hazard ratios (MV HR) calculated using PROC PHREG in SAS version 9.1. We took relative risk (RR) – used in the text – to be equivalent with HR. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, alcohol consumption, and use of MHT.
[2] Calculated after excluding subjects whose BMI at a given age was less than 18.5 kg/m$^2$.
[3] Collapsed BMI categories.
There were 4 women with synchronous colon and rectal cancers. There was missing location data for proximal and distal colon cancers in 26 women.

**Web Table 7 Risk of incident proximal and distal colon cancer in relation to weight change over 3 consecutive age intervals among men in the AARP Diet and Health Study cohort**

| | Average Yearly Weight Change | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Loss ≤-0.50 kg/yr** | **Stable >(-0.50) – (+0.50) kg/yr** | **Gain >0.50 - 1.00 kg/yr** | **Gain >1.00-2.00 kg/yr** | **Gain >2 kg/yr** | **HR per 0.5 kg/yr[2]** | **P for trend[2]** |
| **18 to 35 years** | | | | | | | |
| Proximal colon cases | 14 | 489 | 445 | 173 | 24 | | |
| MV HR[1] | 0.95 | 1.0 | 1.21 | 1.32 | 2.19 | 1.19 | <.0001 |
| (95% CI) | (0.55-1.65) | Ref. | (1.06-1.39) | (1.11-1.58) | (1.44-3.33) | (1.10-1.29) | |
| Distal colon cases | 9 | 374 | 324 | 132 | 16 | | |
| MV HR[1] | 0.69 | 1.0 | 1.17 | 1.31 | 1.76 | 1.16 | 0.001 |
| (95% CI) | (0.35-1.37) | Ref. | (1.00-1.37) | (1.06-1.61) | (1.03-3.01) | (1.06-1.28) | |
| **35 to 50 years** | | | | | | | |
| Proximal colon cases | 39 | 768 | 238 | 90 | 10 | | |
| MV HR | 1.13 | 1.0 | 1.07 | 1.11 | 1.29 | 1.06 | 0.17 |
| (95% CI) | (0.81-1.57) | Ref. | (0.92-1.24) | (0.88-1.39) | (0.69-2.41) | (0.97-1.15) | |
| Distal colon cases | 22 | 563 | 196 | 69 | 5 | | |
| MV HR[1] | 0.79 | 1.0 | 1.10 | 1.04 | 0.62 | 1.00 | 1.00 |
| (95% CI) | (0.50-1.24) | Ref. | (0.92-1.30) | (0.80-1.36) | (0.23-1.66) | (0.91-1.10) | |
| **50 years to baseline** | | | | | | | |
| Proximal colon cases | 58 | 772 | 185 | 104 | 26 | | |
| MV HR[1] | 0.73 | 1.0 | 0.97 | 1.30 | 1.27 | 1.06 | 0.06 |
| (95% CI) | (0.54-0.98) | Ref. | (0.82-1.15) | (1.05-1.61) | (0.85-1.90) | (0.99-1.12) | |
| Distal colon cases | 57 | 554 | 150 | 74 | 20 | | |
| MV HR[1] | 0.96 | 1.0 | 1.09 | 1.22 | 1.21 | 1.06 | 0.12 |
| (95% CI) | (0.71-1.30) | Ref. | (0.90-1.32) | (0.95-1.58) | (0.76-1.92) | (0.98-1.13) | |
| **18 years to baseline** | | | | | | | |
| Proximal colon cases | 3 | 740 | 347 | 55 | 0 | | |
| MV HR | 1.37 | 1.0 | 1.25 | 1.78 | N/A | 1.36 | <.0001 |
| (95% CI) | (0.43-4.33) | Ref. | (1.09-1.43) | (1.33-2.36) | | (1.19-1.56) | |
| Distal colon cases | 1 | 555 | 263 | 35 | 1 | | |
| MV HR[1] | 0.49 | 1.0 | 1.21 | 1.31 | 2.48 | 1.23 | 0.01 |
| (95% CI) | (0.07-3.52) | Ref. | (1.03-1.42) | (0.91-1.88) | (0.35-17.75) | (1.04-1.45) | |

[1] MV HR: multivariable hazard ratio. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, alcohol consumption, and weight at the start of each time period. [2]Calculated after excluding subjects whose average yearly weight gain was negative.

There was missing location data for proximal and distal colon cancers in 70 men.

**Web Table 8 Risk of incident proximal and distal colon cancer in relation to weight change over 3 consecutive age intervals among women in the AARP Diet and Health Study cohort**

| | Average Yearly Weight Change | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Loss ≤-0.50 kg/yr** | **Stable >(-0.50) – (+0.50) kg/yr** | **Gain >0.50 - 1.00 kg/yr** | **Gain >1.00-2.00 kg/yr** | **Gain >2 kg/yr** | **HR per 0.5 kg/yr[2]** | **P for trend[2]** |
| **18 to 35 years** | | | | | | | |
| Proximal colon cases | 24 | 423 | 125 | 32 | 3 | | |
| MV HR[1] | 1.15 | 1.0 | 1.11 | 1.46 | 2.16 | 1.17 | 0.02 |
| (95% CI) | (0.73-1.82) | Ref. | (0.90-1.36) | (1.01-2.12) | (0.69-6.74) | (1.02-1.35) | |
| Distal colon cases | 9 | 237 | 73 | 8 | 2 | | |
| MV HR[1] | 0.70 | 1.0 | 1.12 | 0.63 | 2.29 | 1.01 | 0.91 |
| (95% CI) | (0.34-1.43) | Ref. | (0.85-1.47) | (0.31-1.29) | (0.57-9.24) | (0.83-1.23) | |
| **35 to 50 years** | | | | | | | |
| Proximal colon cases | 11 | 412 | 130 | 40 | 14 | | |
| MV HR[1] | 0.90 | 1.0 | 1.07 | 0.83 | 1.89 | 1.03 | 0.54 |
| (95% CI) | (0.49-1.64) | Ref. | (0.88-1.31) | (0.59-1.17) | (1.10-3.25) | (0.93-1.14) | |
| Distal colon cases | 8 | 221 | 66 | 29 | 5 | | |
| MV HR[1] | 1.22 | 1.0 | 1.00 | 1.12 | 1.13 | 1.02 | 0.75 |
| (95% CI) | (0.60-2.49) | Ref. | (0.75-1.32) | (0.75-1.67) | (0.46-2.78) | (0.89-1.17) | |
| **50 years to baseline** | | | | | | | |
| Proximal colon cases | 27 | 383 | 115 | 66 | 16 | | |
| MV HR[1] | 0.98 | 1.0 | 0.92 | 0.94 | 0.69 | 0.94 | 0.14 |
| (95% CI) | (0.64-1.48) | Ref. | (0.74-1.14) | (0.71-1.23) | (0.40-1.17) | (0.87-1.02) | |
| Distal colon cases | 18 | 202 | 64 | 28 | 17 | | |
| MV HR[1] | 1.03 | 1.0 | 0.98 | 0.76 | 1.36 | 1.01 | 0.80 |
| (95% CI) | (0.60-1.77) | Ref. | (0.74-1.31) | (0.51-1.14) | (0.80-2.31) | (0.92-1.18) | |
| **18 years to baseline** | | | | | | | |
| Proximal colon cases | 1 | 452 | 129 | 24 | 1 | | |
| MV HR | 0.90 | 1.0 | 0.96 | 1.05 | 3.49 | 1.00 | 0.95 |
| (95% CI) | (0.12-6.51) | Ref. | (0.78-1.18) | (0.68-1.62) | (0.49- 24.99) | (0.86-1.18) | |
| Distal colon cases | 0 | 243 | 69 | 17 | 0 | | |
| MV HR[1] | N/A | 1.0 | 0.99 | 1.36 | N/A | 1.07 | 0.54 |
| (95% CI) | | Ref. | (0.75-1.31) | (0.81-2.27) | | (0.87-1.31) | |

[1] MV HR: multivariable hazard ratios. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, alcohol consumption, use of MHT, and weight at the start of each time period. [2]Calculated after excluding subjects whose average yearly weight gain for a given time period was negative.
There was missing location data for proximal and distal colon cancers in 26 women.

**Web Table 9 Relative risk of incident COLON cancer in relation to weight change over 3 consecutive age intervals among men and women in the NIH-AARP Diet and Health Study cohort *after excluding cases diagnosed within two years of cohort entry*.[1]**

| | Average Yearly Weight Change | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Loss ≤-0.50 kg/yr** | **Stable >(-0.50) – (+0.50) kg/yr** | **Gain >0.50 - 1.00 kg/yr** | **Gain >1.00-2.00 kg/yr** | **Gain >2 kg/yr** | **HR per 0.5 kg/yr$^2$** | **P for trend$^2$** |
| **MEN** | | | | | | | |
| 18 to 35 years | | | | | | | |
| CASES | 19 | 747 | 630 | 260 | 33 | | |
| MV HR | 0.78 | 1.0 | 1.13 | 1.29 | 1.96 | 1.17 | <.0001 |
| (95% CI) | (0.49-1.25) | Ref. | (1.02-1.26) | (1.12-1.49) | (1.38-2.78) | (1.10-1.24) | |
| 35 to 50 years | | | | | | | |
| CASES | 47 | 1137 | 363 | 132 | 10 | | |
| MV HR | 0.78 | 1.0 | 1.06 | 1.07 | 0.78 | 1.02 | 0.61 |
| (95% CI) | (0.57-1.05) | Ref. | (0.94-1.20) | (0.89-1.28) | (0.42-1.46) | (0.95-1.09) | |
| 50 years to baseline | | | | | | | |
| CASES | 98 | 1119 | 280 | 154 | 38 | | |
| MV HR | 0.91 | 1.0 | 1.00 | 1.25 | 1.14 | 1.04 | 0.08 |
| (95% CI) | (0.73-1.13) | Ref. | (0.88-1.14) | (1.05-1.49) | (0.82-1.60) | (0.99-1.10) | |
| 18 years to baseline | | | | | | | |
| CASES | 3 | 1105 | 505 | 76 | 0 | | |
| MV HR | 0.83 | 1.0 | 1.18 | 1.49 | N/A | 1.24 | 0.0002 |
| (95% CI) | (0.26-2.61) | Ref. | (1.05-1.31) | (1.17-1.89) | | (1.10-1.39) | |
| **WOMEN** | | | | | | | |
| 18 to 35 years | | | | | | | |
| CASES | 29 | 592 | 172 | 41 | 6 | | |
| MV HR | 0.99 | 1.0 | 1.07 | 1.31 | 2.84 | 1.14 | 0.02 |
| (95% CI) | (0.66-1.48) | Ref. | (0.90-1.28) | (0.95-1.81) | (1.27-6.36) | (1.02-1.29) | |
| 35 to 50 years | | | | | | | |
| CASES | 19 | 566 | 172 | 63 | 20 | | |
| MV HR | 0.99 | 1.0 | 1.02 | 0.94 | 1.81 | 1.05 | 0.22 |
| (95% CI) | (0.62-1.60) | Ref. | (0.86-1.22) | (0.72-1.23) | (1.14-2.85) | (0.97-1.14) | |
| 50 years to baseline | | | | | | | |
| CASES | 40 | 523 | 159 | 89 | 29 | | |
| MV HR | 1.01 | 1.0 | 0.94 | 0.93 | 0.92 | 0.97 | 0.41 |
| (95% CI) | (0.72-1.42) | Ref. | (0.78-1.12) | (0.74-1.17) | (0.62-1.36) | (0.92-1.04) | |
| 18 years to baseline | | | | | | | |
| CASES | 1 | 616 | 181 | 41 | 1 | | |
| MV HR | 0.69 | 1.0 | 1.00 | 1.32 | 2.30 | 1.08 | 0.25 |
| (95% CI) | (0.10-4.95) | Ref. | (0.85-1.19) | (0.95-1.83) | (0.32-16.41) | (0.95-1.23) | |

[1]MV HR: multivariable hazard ratios. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, alcohol consumption, and weight at the start of each time period. [2]Calculated after excluding subjects whose average yearly weight gain was negative.

**Web Table 10 Risk of incident proximal and distal colon cancer in relation to excess BMI across the lifetime among men and women in the AARP Diet and Health Study cohort**

| | | Adulthood excess BMI (kg/m$^2$)[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **BMI < 18.5** | **0** | **≤1** | **>1-2** | **>2-4** | **>4-6** | **>6** | **Hazard ratio per kg/m$^2$ excess BMI[3]** | **P for trend[3]** |
| **MEN** | | | | | | | | | |
| Proximal colon cases | 5 | 463 | 171 | 147 | 191 | 90 | 78 | | |
| MV HR[2] | 1.25 | 1.0 | 1.02 | 1.08 | 1.15 | 1.19 | 1.44 | 1.04 | 0.002 |
| (95% CI) | (0.52-3.01) | Ref. | (0.86-1.22) | (0.90-1.31) | (0.97-1.36) | (0.95-1.50) | (1.13-1.85) | (1.01-1.06) | |
| Distal colon cases | 1 | 336 | 130 | 119 | 129 | 85 | 55 | | |
| MV HR[2] | 0.36 | 1.0 | 1.07 | 1.21 | 1.04 | 1.54 | 1.39 | 1.04 | 0.002 |
| (95% CI) | (0.05-2.54) | Ref. | (0.87-1.32) | (0.97-1.50) | (0.84-1.28) | (1.20-1.97) | (1.03-1.86) | (1.02-1.07) | |
| **WOMEN** | | | | | | | | | |
| Proximal colon cases | 12 | 283 | 90 | 54 | 77 | 42 | 49 | | |
| MV HR[2] | 1.75 | 1.0 | 1.28 | 1.01 | 1.10 | 1.13 | 1.33 | 1.03 | 0.079 |
| (95% CI) | (0.98-3.13) | Ref. | (1.00-1.62) | (0.75-1.35) | (0.85-1.43) | (0.81-1.59) | (0.97-1.83) | (1.00-1.06) | |
| Distal colon cases | 1 | 163 | 40 | 29 | 45 | 21 | 30 | | |
| MV HR[2] | 0.28 | 1.0 | 0.98 | 0.95 | 1.06 | 1.04 | 1.35 | 1.02 | 0.224 |
| (95% CI) | (0.04-2.01) | Ref. | (0.69-1.40) | (0.64-1.41) | (0.75-1.50) | (0.66-1.65) | (0.90-2.04) | (0.99-1.06) | |

[1] Excess BMI defined in men as average of BMI at 18 yrs > 21.5 kg/m$^2$, at 35 yrs > 24.5 kg/m$^2$, at 50 years > 25 kg/m$^2$, and at current age > 25 kg/m$^2$. Among women it was defined as average of BMI at 18 yrs > 20.7 kg/m$^2$, at 35 yrs > 22.4 kg/m$^2$, at 50 years > 25 kg/m$^2$, and at current age > 25 kg/m$^2$. Subjects with BMI at entry less than 18.5 kg/m$^2$ were placed in a separate category regardless of excess BMI (all had to have had a negative value for excess BMI).

[2] MV HR: multivariable hazard ratios. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity, smoking, education, physical activity, and alcohol consumption, and for women, use of MHT. There was no adjustment for initial BMI or height.

[3] Calculated after excluding subjects whose average yearly weight gain for a given time period was negative.

There was missing location data for proximal and distal colon cancers in 70 men and 26 women.

**Web Table 11 Risk of COLON cancer in relation to excess BMI across the lifetime among subjects who were overweight or obese at age 18 (BMI>=25.0) in the NIH-AARP Diet and Health Study cohort.[1]**

| | | Adulthood excess BMI (kg/m$^2$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **BMI < 18.5** | **0** | **<1** | **1-<2** | **2-<4** | **4-<6** | **≥6** | **Hazard ratio per kg/m$^2$ excess BMI[2]** | **P for trend[2]** |
| **MEN** | | | | | | | | | |
| Colon cases | 0 | 5 | 11 | 17 | 61 | 83 | 87 | | |
| MV[3] HR | N/A | 1.0 | 1.04 | 0.66 | 0.67 | 0.98 | 0.92 | 1.04 | 0.20 |
| (95% CI) | | Ref. | (0.36-2.98) | (0.24-1.81) | (0.27-1.67) | (0.40-2.43) | (0.37-2.27) | (0.98-1.09) | |
| **WOMEN** | | | | | | | | | |
| Colon cases | 0 | 4 | 5 | 7 | 13 | 20 | 34 | | |
| MV HR | N/A | 1.0 | 0.98 | 1.11 | 0.80 | 1.42 | 1.11 | 1.02 | 0.62 |
| (95% CI) | | Ref. | (0.26-3.68) | (0.32-3.81) | (0.26-2.50) | (0.48-4.20) | (0.38-3.23) | (0.94-1.10) | |

[1]Excess BMI defined in men as average of BMI at 18 yrs > 21.5 kg/m$^2$, at 35 yrs > 24.5 kg/m$^2$, at 50 years > 25 kg/m$^2$, and at current age > 25 kg/m$^2$. Among women it was defined as average of BMI at 18 yrs > 20.7 kg/m$^2$, at 35 yrs > 22.4 kg/m$^2$, at 50 years > 25 kg/m$^2$, and at current age > 25 kg/m$^2$. Subjects with BMI at entry less than 18.5 kg/m$^2$ were placed in a separate category regardless of excess BMI (all had to have had a negative value for excess BMI). All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity, smoking, education, physical activity, and alcohol consumption, and for women, use of MHT. There was no adjustment for initial BMI or height.
[2]Calculated after excluding subjects whose average yearly weight gain for a given time period was negative.

**Web Table 12 Tests for interactions between age and weight change by incident colorectal cancer sites over 3 consecutive age intervals among men and women in the NIH-AARP Diet and Health Study cohort**

| | P value for interaction between age and weight change |
|---|---|
| **Men** | |
| Weight change from age 18 to age 35 years | |
| Colon | 0.629 |
| Proximal | 0.262 |
| Distal | 0.417 |
| Rectal | 0.931 |
| Weight change from age 35 to age 50 years | |
| Colon | 0.043 |
| Proximal | 0.077 |
| Distal | 0.538 |
| Rectal | 0.305 |
| Weight change from age 50 to baseline age | |
| Colon | 0.327 |
| Proximal | 0.519 |
| Distal | 0.273 |
| Rectal | 0.415 |
| Weight change from age 18 to baseline age | |
| Colon | 0.211 |
| Proximal | 0.597 |
| Distal | 0.348 |
| Rectal | 0.659 |
| **Women** | |
| Weight change from age 18 to age 35 years | |
| Colon | 0.894 |
| Proximal | 0.598 |
| Distal | 0.444 |
| Rectal | 0.555 |
| Weight change from age 35 to age 50 years | |
| Colon | 0.983 |
| Proximal | 0.758 |
| Distal | 0.696 |
| Rectal | 0.202 |
| Weight change from age 50 to baseline age | |
| Colon | 0.707 |
| Proximal | 0.746 |
| Distal | 0.985 |
| Rectal | 0.745 |
| Weight change from age 18 to baseline age | |
| Colon | 0.919 |
| Proximal | 0.775 |
| Distal | 0.514 |
| Rectal | 0.476 |

**Web Table 13 Tests for interactions between gender and weight change by incident colorectal cancer sites over 3 consecutive age intervals among men and women in the NIH-AARP Diet and Health Study cohort**

| | P value for interaction between sex and weight change |
|---|---|
| Weight change from age 18 to age 35 years | |
| Colon | 0.226 |
| Proximal | 0.177 |
| Distal | 0.479 |
| Rectal | 0.330 |
| Weight change from age 35 to age 50 years | |
| Colon | 0.595 |
| Proximal | 0.449 |
| Distal | 0.885 |
| Rectal | 0.913 |
| Weight change from age 50 to baseline age | |
| Colon | 0.001 |
| Proximal | 0.0001 |
| Distal | 0.522 |
| Rectal | 0.997 |
| Weight change from age 18 to baseline age | |
| Colon | 0.002 |
| Proximal | 0.0008 |
| Distal | 0.332 |
| Rectal | 0.687 |

**Web Table 14 Relative risk of incident COLON cancer in relation to weight change over 3 consecutive age intervals (unadjusted for weight at the beginning of each interval) among men and women in the NIH-AARP Diet and Health Study cohort.[1]**

| | Average Yearly Weight Change | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Loss ≤-0.50 kg/yr** | **Stable >(-0.50) – (+0.50) kg/yr** | **Gain >0.50 - 1.00 kg/yr** | **Gain >1.00-2.00 kg/yr** | **Gain >2 kg/yr** | **HR per 0.5 kg/yr[2]** | **P for trend[2]** |
| **MEN** | | | | | | | |
| 18 to 35 years | | | | | | | |
| CASES | 24 | 893 | 797 | 315 | 41 | | |
| MV HR | 1.02 | 1.0 | 1.17 | 1.28 | 1.90 | 1.16 | <.0001 |
| (95% CI) | (0.68-1.53) | Ref. | (1.06-1.29) | (1.12-1.46) | (1.37-2.64) | (1.10-1.23) | |
| 35 to 50 years | | | | | | | |
| CASES | 61 | 1380 | 448 | 166 | 15 | | |
| MV HR | 0.98 | 1.0 | 1.06 | 1.08 | 0.95 | 1.03 | 0.35 |
| (95% CI) | (0.75-1.28) | Ref. | (0.95-1.19) | (0.91-1.28) | (0.56-1.62) | (0.97-1.10) | |
| 50 years to baseline | | | | | | | |
| CASES | 125 | 1371 | 345 | 182 | 47 | | |
| MV HR | 1.01 | 1.0 | 1.03 | 1.29 | 1.30 | 1.07 | 0.005 |
| (95% CI) | (0.83-1.23) | Ref. | (0.91-1.16) | (1.10-1.52) | (0.96-1.75) | (1.02-1.11) | |
| 18 years to baseline | | | | | | | |
| CASES | 4 | 1346 | 626 | 93 | 1 | | |
| MV HR | 1.17 | 1.0 | 1.18 | 1.51 | 1.10 | 1.26 | <.0001 |
| (95% CI) | (0.44- 3.13) | Ref. | (1.07-1.30) | (1.21-1.88) | (0.15-7.80) | (1.14-1.40) | |
| **WOMEN** | | | | | | | |
| 18 to 35 years | | | | | | | |
| CASES | 33 | 675 | 206 | 42 | 6 | | |
| MV HR | 1.14 | 1.0 | 1.12 | 1.20 | 2.56 | 1.14 | 0.02 |
| (95% CI) | (0.81-1.63) | Ref. | (0.95-1.31) | (0.88-1.66) | (1.15-5.73) | (1.02-1.27) | |
| 35 to 50 years | | | | | | | |
| CASES | 20 | 647 | 202 | 72 | 21 | | |
| MV HR | 1.10 | 1.0 | 1.06 | 0.97 | 1.84 | 1.07 | 0.11 |
| (95% CI) | (0.71-1.72) | Ref. | (0.90-1.25) | (0.75-1.25) | (1.18-2.86) | (0.98-1.15) | |
| 50 years to baseline | | | | | | | |
| CASES | 47 | 597 | 187 | 98 | 33 | | |
| MV HR | 1.18 | 1.0 | 0.99 | 0.94 | 0.99 | 0.99 | 0.71 |
| (95% CI) | (0.87-1.61) | Ref. | (0.84-1.17) | (0.76-1.18) | (0.69-1.44) | (0.93-1.05) | |
| 18 years to baseline | | | | | | | |
| CASES | 1 | 712 | 205 | 43 | 1 | | |
| MV HR | 0.73 | 1.0 | 0.98 | 1.22 | 2.08 | 1.04 | 0.50 |
| (95% CI) | (0.10-5.18) | Ref. | (0.84-1.16) | (0.88-1.68) | (0.29-14.88) | (0.92-1.18) | |

[1]MV HR: multivariable hazard ratios. All analyses are adjusted for age (in the baseline hazard of the Cox regression) and covariates: race/ethnicity; education, physical activity, smoking, and alcohol consumption. [2]Calculated after excluding subjects whose average yearly weight gain was negative.