Exploring the role of physical activity in maintaining health through DNA repair, thyroid cancer prevention, and obesity-specific quality of life

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Abstract

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Background. Regular physical activity has an abundance of physical and mental health benefits; however much remains to be elucidated about the benefits of long-term versus short-term activity for cancer prevention, potential mechanisms linking activity and cancer prevention, and the relationship between activity and quality of life. The goal of this research was to investigate these questions and contribute to the understanding of the role of physical activity in maintaining health across the life span. Methods. The association between long-term physical activity and risk of papillary thyroid cancer was investigated among 116,939 women in the California Teachers Study (CTS) using Cox proportional hazards regression to estimate relative risks (RRs) and 95% confidence intervals (CIs). Recent physical activity
was examined in relation to DNA damage and repair among 122 healthy, older participants in the Vitamins and Lifestyle (VITAL) cohort validation sample using linear regression to estimate beta coefficients and 95% CIs. Finally, associations of physical activity and sedentary behavior with log-transformed obesity-specific quality of life (QoL) scores were investigated among women in the Socioeconomic Status and Obesity (SESO) Study using linear regression to estimate back-transformed geometric means and 95% CIs. All analyses additionally examined the role of body mass index (BMI) in associations. **Results.** Long-term physical activity was significantly associated with a reduced risk of papillary thyroid cancer in the CTS only for normal-weight women (BMI<25 kg/m²). Recent physical activity was significantly positively associated with 60-minute DNA repair among VITAL participants, even when adjusting for BMI. Physical activity was significantly positively associated with obesity-specific QoL scores in the SESO Study to varying degrees among Non-Hispanic White (NHW), English-speaking Hispanic (ESH), and Spanish-speaking Hispanic women. Sedentary time was significantly negatively associated with obesity-specific QoL for NHW and ESH women. Many observed associations were attenuated or accounted for when additionally adjusting for dietary behaviors or BMI. **Discussion.** Results indicate that physical activity is beneficial for thyroid cancer prevention, DNA repair, and obesity-specific QoL. Additional longitudinal analyses are needed to assess the long-term benefits of increasing physical activity levels and to parse out mechanisms and potential subgroup differences.
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Chapter I: Recreational physical activity and risk of papillary thyroid cancer among women in the California Teachers Study

Abstract

Little is known about the relationship between physical activity and thyroid cancer risk, and few cohort data on this association exist. Thus, the present study aimed to prospectively examine long-term activity and risk of papillary thyroid cancer among women. 116,939 women in the California Teachers Study, aged 22 to 79 years with no history of thyroid cancer at cohort entry, were followed from 1995-1996 through 2009; 275 were diagnosed with invasive papillary thyroid cancer. Cox proportional hazards regression provided relative risk (RR) estimates and 95% confidence intervals (CI) for associations between thyroid cancer and combined strenuous and moderate recreational physical activity both in the long-term (high school through age 54 years or current age if younger than 54 years) and recently (during the three years prior to joining the cohort). Overall, women whose long-term recreational physical activity averaged at least 5.5 MET-hours/week (i.e. were active) had a non-significant 23% lower risk of papillary thyroid cancer than inactive women (RR=0.77, 95% CI: 0.57, 1.04). RR estimates were stronger among normal weight or underweight women (body mass index, BMI<25.0 kg/m^2, trend p=0.03) than among overweight or obese women (trend p=0.35; homogeneity-of-trends p=0.03). A similar pattern of risk was observed for recent activity (BMI<25 kg/m^2, trend p=0.11; BMI≥25 kg/m^2, trend p=0.16; homogeneity-of-trends p=0.04). Associations for long-term activity did not appear to be
driven by activity in any particular life period (e.g. youth, adulthood). Physical activity may reduce the risk of papillary thyroid cancer in normal weight and underweight women.

**Introduction**

Rates of thyroid cancer in women in the US (18.5 per 100,000) are three times those of men (5.9 per 100,000) and age-specific incidence patterns differ by sex. Rates among women increase rapidly during adolescence and young adult years, and plateau around menopause. Rates for men increase slowly and steadily throughout life until age 74 years, after which they decline. Papillary thyroid cancer, the most common type of thyroid cancer, accounts for approximately 86% of thyroid cancers in the US. The median age of papillary thyroid cancer diagnosis is 46 years. Notably, the age-adjusted incidence rates of papillary thyroid cancer have tripled among women and doubled among men between 1980 and 2005.

While improved imaging and diagnostic techniques probably account for some portion of the observed increase in incidence, other factors are also likely involved.

Established risk factors for thyroid cancer include ionizing radiation (particularly exposures in infancy and childhood) and family history of proliferative thyroid disease (including goiter, benign nodules and adenomas). Hyperthyroidism/hypothyroidism, iodine deficiency (for follicular subtype), and certain hormonal and reproductive factors have also been associated with increased risk. However, few studies have examined physical activity, which may affect risk of thyroid cancer through DNA repair, and hormonal, metabolic, and anti-inflammatory pathways.

While the relationship between physical activity and reduced risk of some cancers (e.g., breast cancer) is well-established, its relationship with thyroid cancer has only been
minimally addressed. One study\textsuperscript{30} found that any strenuous recreational exercise on a regular basis (at least 24 times per year) in the two years prior to the diagnosis or reference date was associated with a 24% reduced risk of papillary thyroid cancer. Other studies\textsuperscript{8, 13, 31-34} showed null results, but either the method of physical activity measurement was not described in detail\textsuperscript{31, 32}, or physical activity was measured using instruments assessing only current activity\textsuperscript{33, 34} or activity during the previous year at the time of cohort enrollment\textsuperscript{8, 13, 34}. Body size may also influence thyroid cancer risk\textsuperscript{35, 36}.

Although the aforementioned studies on physical activity and thyroid cancer risk have primarily measured current or recent activity\textsuperscript{8, 13, 32-34}, activity performed earlier in life or throughout the life span may be a more important determinant of cancer risk. To date, only one study\textsuperscript{30} has examined the association between physical activity during adolescence and thyroid cancer risk, and results showed a 17%, statistically non-significant risk reduction among women who reported exercising regularly between ages 12 and 21 years. No prospective cohort study has examined the association between long-term physical activity and thyroid cancer risk.

The hypothesis for this study was that long-term recreational physical activity is associated with decreased relative risk of papillary thyroid cancer among women participating in the California Teachers Study (CTS). The possible confounding or modifying effects of body mass index (BMI) were also examined.

\textit{Methods}

\textbf{Study population and data collection}
The CTS is a prospective cohort study of 133,479 female public school teachers and administrators who were current or retired public school professionals and members of the California State Teachers Retirement System at the time the study began in 1995\textsuperscript{37}. Women joined the cohort by completing a mailed baseline questionnaire in 1995-1996. The baseline questionnaire collected information on demographics; personal and family history of selected diseases and conditions (including some cancers); smoking; diet during the past year (as measured by Block’s food frequency questionnaire\textsuperscript{38}); alcohol consumption in various life periods; menstrual and reproductive histories; use of hormones; height; weight; and recreational physical activity.

The CTS was developed by a consortium of 11 investigators from the California Department of Health Services; Cancer Prevention Institute of California (formerly the Northern California Cancer Center); the University of California, Irvine; and the University of Southern California. The CTS was approved by the institutional review board at each of the four participating centers in accord with assurances filed with and approved by the US Department of Health and Human Services.

The physical activity assessment provided examples of moderate activities (e.g. brisk walking and golf) and strenuous activities (e.g. swimming laps, running). Participants were asked to estimate for total moderate activities and for total strenuous activities how many hours per week (none, \(\frac{1}{2}, 1, 1 \frac{1}{2}, 2, 3, 4-6, 7-10, \) and 11 or more hours per week) and months per year (1-3, 4-6, 7-9, and 10-12 months per year) they performed these activities during six time intervals (during high school; between the ages of 18-24, 25-34, 35-44 and 45-54 years; and during the past 3 years). Annual hours per week for each period was calculated
separately for mean strenuous activity and mean moderate activity by multiplying the hours per week (using values of 5 hours, 8.5 hours, and 12 hours per week for the three upper activity categories) by the portion of the year in which the woman engaged in the activity. Approximate metabolic equivalent (MET) values from the compendium of energy costs of common physical activities\textsuperscript{39} were assigned to each of moderate activities (4.5 METs) and strenuous activity (6.5 METs). Total MET-hours per week per year were calculated for each age period by multiplying the average hours per week per year in each category of activity (moderate or strenuous) by the appropriate MET value. Within each age period, this computed value was assigned to each year of age that the woman completed (e.g., for a 50 year-old woman, this value was assigned for the years from age 45 through age 50 years).

Long-term recreational physical activity was defined for this analysis as MET-hours per week of recreational physical activity from high school through age 54 years (or the participant's age at cohort entry if younger), and was calculated separately for moderate and strenuous activity by averaging the aforementioned period-specific MET hours per week per year values across all relevant age periods. Recent physical activity was defined as activity reported for the 3-year period prior to cohort entry and MET hours per week were assigned as described above. Measures of moderate and strenuous physical activity were also combined by summing the MET-hours per week per year values. MET-hours per week of combined moderate and strenuous activity were categorized as <5.5, 5.5-16.4, 16.5-32.9, and 33.0+ (approximate quartiles). Risk for \( \geq 5.5 \) MET-hours per week of combined moderate and strenuous activity compared to <5.5 MET-hours per week was considered a proxy for any vs. no activity. Finally, a 4-level summary variable describing combined moderate and strenuous
activity (active vs. inactive) in both early adulthood (ages 18-24) and middle adulthood (ages 25-54) was examined.

To define the eligible cohort, excluded in sequence were: women who were not residents of California at baseline (n=8,867, 6.6%), who restricted their participation to the study of breast cancer (n=18), who had a prior history of thyroid cancer as of baseline (n=557, 0.4%) or whose history of prior cancer was unknown (n=662, 0.5%), for whom baseline questionnaire responses were deemed to be unreliable (n=3), and who were 80 years or older at baseline (n=5,728, 4.3%). Also excluded were women who did not complete the physical activity section on the baseline questionnaire (n=665, 0.5%), and women whose reported time spent in daily activities (casual walking, housework, standing or walking at work, sitting, and sleeping) was improbable (n=40). Thus, 116,939 women comprised the analytic cohort.

**Assessment of thyroid cancer incidence**

Participants diagnosed with a first primary papillary thyroid cancer (ICD-O-3 site code C73.9 and histology codes 8050, 8260, 8340-8344, and 8350) after joining the cohort and before January 1, 2010 were identified through linkage with the California Cancer Registry (CCR), a legally-mandated statewide population-based cancer reporting system. CCR ascertainment of newly-diagnosed cancers is estimated to be 99% complete.

Person-time of follow-up began on the date the baseline questionnaire was completed in 1995-1996 and ended with the first of the following: a thyroid cancer diagnosis of any type (n=309 total), a permanent move outside of California (n=10,822), death (n=10,512), or December 31, 2009 (n=95,296). Residence was monitored through annual mailings of a
newsletter or questionnaire, annual linkages with the US Postal Service national change-of-address database, and change-of-address postcards submitted by participants; a permanent move outside of California was considered to occur when a woman left California for at least four months. The eligible cohort accrued 1,488,391 person-years of follow-up for analysis; median follow-up time was 12.7 years. Analyses were restricted to papillary thyroid cancer (n=275), the most common type of thyroid cancer, as the number of cases of other histologic subtypes (n=34) was too small for evaluation and etiologies of subtypes vary. Women with histologic subtypes other than papillary thyroid cancer, who moved out of California or who died were censored on the dates these events occurred.

**Statistical analyses**

The hazard rate ratio (represented as the relative risk [RR] and corresponding 95% confidence interval [CI]) was estimated for associations between long-term and recent physical activity and papillary thyroid cancer risk by fitting multivariable Cox proportional hazards regression models. The time scale (in days) was defined from age at baseline to age at event, censoring or end of follow-up. All Cox models were stratified by age at baseline (in years) to adjust for calendar effects. Models were also adjusted for race/ethnicity (non-Hispanic White, Other) as an a priori potential confounder. The 911 (0.8%) women who declined to state their race/ethnicity were combined with women of other races or ethnicities.

Candidate covariates were selected based upon associations documented in the literature between measured variables and both the exposure of physical activity and the outcome of papillary thyroid cancer. Covariates (assessed at baseline) were evaluated for confounding using a stringent 5% change in the race/ethnicity-adjusted and age-stratified
physical activity RR when adjusting for each covariate (individually). Health history covariates included history of thyroid disease, family history of thyroid cancer, history of smoking at least 100 cigarettes, alcohol intake during the past year, and tertiles of daily energy intake (kcal). Menstruation variables included age at menarche and a variable combining cycle length and time elapsing before menstrual periods became regular (assessed as the age at which a girl was able to predict within a few days when her next period would start). Additional reproductive history covariates included any oral contraceptive use, time between a woman’s last pregnancy and joining the cohort, and a combined variable for menopausal status and hormone therapy. Of these potential confounders, only oral contraceptive use (ever, never, unknown) met the study definition of a confounder, and thus was the only other covariate included in the multivariable-adjusted models. Analyses examining separate effects of moderate activity and strenuous activity were mutually adjusted. BMI (<25.0, 25.0-29.9, ≥30.0 kg/m²) was treated as a potential mediating variable, and multivariable-adjusted models were further adjusted for BMI to evaluate how much of the physical activity association, if any, could be attributed to BMI. All potential confounders and BMI were included in their categorical forms.

Tests for trend were conducted to examine the dose-response relationship between physical activity and papillary thyroid cancer risk by using ordinal values corresponding to each exposure category and determining whether or not the slope parameter differed from zero using the Wald test. Analyses involving the categorical variable for various combinations of activity in early adulthood and adulthood were limited to women aged 54 years or older, who had complete activity histories through age 54 years.
BMI (<25.0, ≥25.0 kg/m²) was also examined as a potential effect modifier. In order to test for effect modification of physical activity by BMI, two physical activity variables were created, each representing the 4 categories of physical activity, one for women with BMI <25.0 kg/m² and another for women with BMI ≥25.0 kg/m² (Table 2). Homogeneity-of-trends was tested using a likelihood ratio (LR) test in which a model that fit a single variable representing the trend across 4 categories of physical activity (and adjusting for BMI) was compared to a model (also adjusted for BMI) that fit the two physical activity trend variables.

All statistical significance levels (p values) reported are two-sided. P values ≤0.05 were considered statistically significant and were not corrected for multiple testing.

Statistical analyses were conducted using Stata/IC (version 11.0; StataCorp LP, College Station, TX).

Results

Select characteristics of women in the analytic cohort are shown in Table 1. The median age at diagnosis was 57.0 years. Non-Hispanic White women and women using oral contraceptives tended to report higher levels of long-term physical activity.

Women whose long-term physical activity averaged at least 5.5 MET-hours per week per year of combined moderate and strenuous activity were estimated to have a 23% lower risk of papillary thyroid cancer than women who averaged less activity (i.e. were “inactive”), but the confidence interval contained 1.0 (RR=0.77 95% CI: 0.57, 1.04, Table 2). Inclusion of BMI in the model did not attenuate the risk estimate (RR=0.77, 95% CI: 0.57, 1.04). Similarly, no association was observed between recent physical activity (activity during the three years before baseline) and papillary thyroid cancer.
BMI modified the effect of long-term combined moderate and strenuous physical activity on papillary thyroid cancer risk (homogeneity-of-trends across BMI categories \( p=0.03 \); Table 3). Risk declined with increasing long-term activity among women with BMI under 25.0 kg/m\(^2\) (i.e. those who were normal weight or underweight). Among these women, those performing 33.0+ MET-hours/week of long-term moderate and strenuous activity experienced a lower risk of papillary thyroid cancer (RR=0.63, 95% CI: 0.39, 1.02) than those performing less than 5.5 MET-hours/week (trend \( p=0.03 \)). A similar pattern was not observed among overweight or obese women. When examining moderate and strenuous long-term activity separately, the greater protection associated with higher levels of combined activity did not appear to be driven by strenuous activity (trend \( p=0.34 \)), but rather by moderate activity (trend \( p=0.06 \)). Further analyses revealed that physical activity in early adulthood appeared to confer risk reduction that was similar to activity in middle adulthood (data not shown).

Examining recent physical activity, BMI also modified the effect of recent combined moderate and strenuous physical activity on papillary thyroid cancer risk (homogeneity-of-trends \( p=0.04 \); Table 3). For normal and underweight women (BMI<25.0 kg/m\(^2\)), higher levels of physical activity were associated with lower risk, but for overweight or obese women, the trend was reversed; however, neither test for trend was statistically significant (trend \( p=0.11 \) and 0.16, respectively).

**Discussion**

This study found no association between physical activity and risk of thyroid cancer in the overall study population, but results suggest that physical activity is associated with a
decreased risk of papillary thyroid cancer among normal weight or underweight women; among these women, those who averaged at least 16.5 MET-hours per week per year of activity from high school through age 54 years experienced approximately a 40% risk reduction. No such association was observed for overweight or obese women (BMI ≥ 25.0 kg/m²).

Two⁸,³² of the five⁸,¹³,³⁰,³²,³³ prior studies of physical activity and thyroid cancer did not provide specific results for papillary thyroid cancer among women, and no studies have examined the role of long-term physical activity in thyroid cancer risk. Kolonel et al.³² observed no statistically significant association between thyroid cancer risk and heavy occupational physical activity in women (OR=0.9, 95% CI: 0.6, 1.5), but neither the time period that was assessed, nor the duration of activity, was described. Similarly, Meinhold et al.¹³, Leitzmann et al.⁸, and Kabat et al.³³ found no association in their prospective studies. Meinhold et al.¹³ reported a relative risk (RR) of 0.81 (95% CI: 0.51, 1.29) among women for one hour or more of strenuous activity per week in the year prior to enrollment, and note that restriction to papillary subtype did not markedly change their findings. Leitzmann et al.⁸ reported a RR for papillary thyroid cancer of 0.89 (95% CI: 0.59, 1.36) among both men and women for 20 minutes or more of vigorous activity, five times per week within the year prior to enrollment, but did not present RRs for women. Both of these studies only examined recent activity, within the year prior to cohort enrollment. While Kabat et al.³³ examined physical activity prospectively, the “usual” pattern of activity rather than long-term activity was assessed, and their study was restricted to postmenopausal women having a mean age at diagnosis of nearly 62 years, whereas the distribution of age in the present study was
younger, with a median age at diagnosis of 57 years. In the only study to evaluate papillary-specific results in women and report a significant association, regular (at least 24 times per year) strenuous recreational exercise in the two years prior to the diagnosis or reference date was associated with a 24% reduction in the odds of papillary thyroid cancer (odds ratio [OR]=0.76, 95% confidence interval [CI]=0.59, 0.98) with similar results for activity between the ages of 12 and 21 years, but no dose-response relationship was observed.\textsuperscript{30}

A pooled analysis, the largest study of physical activity and thyroid cancer risk to date, examined five cohorts (including the Meinhold et al.\textsuperscript{13} and Leitzmann et al.\textsuperscript{8} cohorts) and reported no association between physical activity and thyroid cancer; however, all five cohorts assessed only current or recent activity characterized by study-specific tertiles (low, medium, high), three cohorts assessed only vigorous/strenuous activity, and although results were presented for women and for all participants with papillary subtype, results specific to women with papillary subtype were not provided. The results from the present study showed that more moderate levels of physical activity were associated with reduced risk of papillary thyroid cancer among women specifically, so it is possible that the lack of a significant association in the pooled analysis can be explained by the broader study population and choice of physical activity measurement (e.g. an emphasis on recent, strenuous activity).

The current study examined both long-term and recent recreational physical activity, and provides some evidence for an association with lower papillary thyroid cancer risk, unlike prior cohort studies\textsuperscript{8,13,33} showing little or no association. The magnitude of risk reduction found in this study for long-term combined moderate and strenuous physical activity among women who were normal weight or underweight was approximately 40% for
an average of at least 16.5 MET-hours per week of activity from high school through age 54 years; this is slightly larger than risk reductions observed in the aforementioned studies\textsuperscript{8, 13, 30, 32, 33}. While Leitzman et al.\textsuperscript{8} presented the effects of physical activity separately for each BMI group (<25.0, 25.0-29.9, ≥30.0 kg/m\textsuperscript{2}), both men and women were included in their analysis and, for their measure of recent activity, no trend across levels of physical activity was observed within any of the BMI groups.

Several pathways may be relevant in explaining associations between physical activity and thyroid cancer risk, including DNA repair, and anti-inflammatory and hormonal mechanisms. DNA damage, in particular single and double strand breaks\textsuperscript{43}, has been shown to be associated with thyroid cancer risk\textsuperscript{17}, and moderate physical activity may protect against DNA damage and increase DNA repair\textsuperscript{16-18}, likely through increased telomerase action and reduced telomere shortening\textsuperscript{44}. Physical activity is also associated with elevated levels of adiponectin, an anti-inflammatory factor\textsuperscript{21, 45} which may be associated with decreased risk of thyroid cancer\textsuperscript{46}. However, these potential mechanisms may not explain why the association between physical activity and thyroid cancer risk was restricted to normal- or underweight women.

A hormonal hypothesis may also shed light on the results. Long-term physical activity appears to reduce levels of circulating, biologically available sex hormones such as estrogen and androgens\textsuperscript{19} which drive cell proliferation and increase the chances of random genetic mutations\textsuperscript{20}, in turn reducing the risk of cancer. Physical activity may also increase amounts of circulating sex-hormone binding globulin, thereby reducing the availability of hormones, such as estradiol, to influence target tissues\textsuperscript{19, 47}, in turn reducing proliferation of
thyroid cancer cells\textsuperscript{48}. Decreased levels of female hormones may also lower levels of thyroid stimulating hormone (TSH) which is associated with thyroid hyperplasia and possibly cancer\textsuperscript{7}. Thus, the aforementioned mechanisms, independently and combined, could lead to a decreased risk of thyroid cancer, which has been proposed as a hormone-related cancer\textsuperscript{20, 49}.

The lack of any association among overweight or obese women is puzzling; issues of measurement error may be greater among overweight and obese women.

The present study has several limitations. Data on physical activity, BMI (previously validated\textsuperscript{50}) and other potential confounders were assessed by self-report, and are thus subject to reporting error. The mean age at cohort entry was 51.9 years (standard deviation 13.1 years), so the recall period for activity in the earlier age periods (e.g. 18-24 years in particular) would be greater for older women. Validity information of the physical activity measure is not available given that no historical data on physical activity of these women is available for comparison. Nonetheless, because this is a prospective cohort study, any errors in reporting would likely be non-differential between women who later developed papillary thyroid cancer and those who did not, but could theoretically differ based on personal characteristics such as weight. Non-differential reporting errors would bias the relative risk estimates toward the null value. Previous results have shown that the activity measures used in this study are associated with a decreased risk of breast cancer\textsuperscript{28} and colon cancer\textsuperscript{51} among women in the CTS. This study did not assess occupational or household physical activity, which could be important determinants of total energy expenditure\textsuperscript{28, 52} that may affect risk of thyroid cancer.
The majority of women in the study are non-Hispanic White, and thus it was not possible to determine whether risk varies by race or ethnicity. In addition, education and income were not assessed on the baseline survey, but education levels should be similar (all women would be expected to have college degrees) and even if income levels differed, socioeconomic status (as measured from follow-up surveys and by census data related to residential address at baseline) has not been found to be a confounder in similar CTS studies (e.g. physical activity and breast cancer).

Despite its limitations, the present study has several noteworthy strengths. It is the first study to assess long-term physical activity and thyroid cancer risk in a cohort study. By collecting information on physical activity at baseline (prior to diagnosis), differential recall by disease status, as is often present in case-control studies, is minimized. With 116,939 women and 1,488,391 person-years of follow-up, this is one of the largest cohort studies to examine physical activity and thyroid cancer risk prospectively, and the study size afforded us the opportunity to assess risk by BMI strata and to observe potentially important effect modification.

In summary, the present study found that long-term physical activity averaging at least 16.5 MET-hours per week was associated with reduced risk of papillary thyroid cancer in women with a BMI under 25.0 kg/m².

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Tables

Table 1. CTS Table 1. Age-adjusted\textsuperscript{a} percent distribution of baseline characteristics overall and by average annual moderate plus strenuous long-term physical activity for 116,939 women aged less than 80 years in the California Teachers Study

<table>
<thead>
<tr>
<th></th>
<th>Total (N)</th>
<th>&lt;5.5 (n=20,567)</th>
<th>5.5-16.4 (n=33,844)</th>
<th>16.5-32.9 (n=32,595)</th>
<th>(\geq)33.0 (n=29,933)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>100,955</td>
<td>16.4</td>
<td>30.1</td>
<td>28.8</td>
<td>24.7</td>
</tr>
<tr>
<td>Other/not stated</td>
<td>15,984</td>
<td>22.6</td>
<td>28.5</td>
<td>25.3</td>
<td>23.7</td>
</tr>
<tr>
<td><strong>History of benign thyroid disease/condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>105,163</td>
<td>17.1</td>
<td>29.7</td>
<td>28.5</td>
<td>24.8</td>
</tr>
<tr>
<td>Yes</td>
<td>11,776</td>
<td>18.9</td>
<td>31.7</td>
<td>27.1</td>
<td>22.3</td>
</tr>
<tr>
<td><strong>Family history of thyroid cancer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>111,871</td>
<td>17.2</td>
<td>29.9</td>
<td>28.4</td>
<td>24.5</td>
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<tr>
<td>Yes</td>
<td>1,461</td>
<td>16.8</td>
<td>28.3</td>
<td>29.6</td>
<td>25.4</td>
</tr>
<tr>
<td>Adopted/unknown</td>
<td>3,607</td>
<td>19.9</td>
<td>28.6</td>
<td>26.1</td>
<td>25.5</td>
</tr>
<tr>
<td><strong>History of lifetime smoking 100+ cigarettes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td>76,890</td>
<td>17.5</td>
<td>29.7</td>
<td>28.3</td>
<td>24.5</td>
</tr>
<tr>
<td>Yes</td>
<td>39,441</td>
<td>16.7</td>
<td>30.2</td>
<td>28.5</td>
<td>24.6</td>
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<tr>
<td>Unknown</td>
<td>608</td>
<td>18.3</td>
<td>30.6</td>
<td>31.6</td>
<td>19.6</td>
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<tr>
<td><strong>Alcohol intake in the past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td>37,041</td>
<td>21.1</td>
<td>30.6</td>
<td>26.3</td>
<td>22.1</td>
</tr>
<tr>
<td>Yes</td>
<td>74,131</td>
<td>15.2</td>
<td>29.6</td>
<td>29.4</td>
<td>25.8</td>
</tr>
<tr>
<td>Unknown</td>
<td>5,767</td>
<td>20.5</td>
<td>28.4</td>
<td>27.3</td>
<td>23.8</td>
</tr>
<tr>
<td><strong>Tertiles of daily caloric intake, kcal/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>35,673</td>
<td>20.0</td>
<td>30.9</td>
<td>27.5</td>
<td>21.6</td>
</tr>
<tr>
<td>Second</td>
<td>35,635</td>
<td>16.4</td>
<td>30.6</td>
<td>28.9</td>
<td>24.1</td>
</tr>
<tr>
<td>Third</td>
<td>35,685</td>
<td>14.1</td>
<td>28.4</td>
<td>29.2</td>
<td>28.3</td>
</tr>
<tr>
<td>Unknown</td>
<td>9,946</td>
<td>22.4</td>
<td>28.9</td>
<td>25.8</td>
<td>23.0</td>
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<tr>
<td><strong>Oral contraceptive use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>35,126</td>
<td>22.8</td>
<td>28.8</td>
<td>24.9</td>
<td>23.6</td>
</tr>
<tr>
<td>Ever</td>
<td>77,472</td>
<td>15.2</td>
<td>30.2</td>
<td>29.7</td>
<td>24.9</td>
</tr>
<tr>
<td>Unknown</td>
<td>4,341</td>
<td>20.9</td>
<td>30.2</td>
<td>24.6</td>
<td>24.4</td>
</tr>
<tr>
<td><strong>Body mass index, kg/m\textsuperscript{2}</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25.0</td>
<td>68,657</td>
<td>15.3</td>
<td>28.9</td>
<td>29.1</td>
<td>26.7</td>
</tr>
<tr>
<td>25.0-29.9</td>
<td>28,094</td>
<td>18.5</td>
<td>30.9</td>
<td>28.3</td>
<td>22.2</td>
</tr>
<tr>
<td>(\geq)30.0</td>
<td>16,098</td>
<td>21.5</td>
<td>32.5</td>
<td>26.1</td>
<td>20.0</td>
</tr>
<tr>
<td>Unknown</td>
<td>4,090</td>
<td>24.3</td>
<td>28.2</td>
<td>24.8</td>
<td>22.8</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Variables in table are adjusted to the age distribution (5-year age groups) of the 116,939 women ages 22-79 years who comprise the eligible cohort for the analysis.

\textsuperscript{b}Percentages may not sum to 100% due to rounding.
Table 2. CTS Table 2. Relative risks for the association between long-term and recent physical activity and papillary thyroid cancer in 116,939 women under 80 years of age in the California Teachers Study

<table>
<thead>
<tr>
<th></th>
<th>Observed person-years</th>
<th>No. cases</th>
<th>Adjusted relative risk(^a) (95% confidence interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td><strong>AVERAGE ANNUAL MODERATE PHYSICAL ACTIVITY</strong></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td><strong>Long-term</strong></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td>&lt;5.5</td>
<td>294,078</td>
<td>59</td>
<td>Reference</td>
</tr>
<tr>
<td>≥5.5</td>
<td>1,194,313</td>
<td>216</td>
<td>0.83 (0.61-1.12)</td>
</tr>
<tr>
<td>5.5-16.4</td>
<td>377,549</td>
<td>70</td>
<td>0.85 (0.60-1.21)</td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>387,847</td>
<td>71</td>
<td>0.84 (0.59-1.21)</td>
</tr>
<tr>
<td>33.0+</td>
<td>428,917</td>
<td>75</td>
<td>0.80 (0.55-1.17)</td>
</tr>
<tr>
<td>Trend (p)</td>
<td></td>
<td></td>
<td>0.29</td>
</tr>
<tr>
<td><strong>Past 3 years</strong></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td>&lt;5.5</td>
<td>382,983</td>
<td>75</td>
<td>Reference</td>
</tr>
<tr>
<td>≥5.5</td>
<td>1,105,408</td>
<td>200</td>
<td>0.90 (0.68-1.18)</td>
</tr>
<tr>
<td>5.5-16.4</td>
<td>310,186</td>
<td>61</td>
<td>0.98 (0.70-1.39)</td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>307,855</td>
<td>53</td>
<td>0.85 (0.59-1.22)</td>
</tr>
<tr>
<td>33.0+</td>
<td>487,367</td>
<td>86</td>
<td>0.87 (0.62-1.21)</td>
</tr>
<tr>
<td>Trend (p)</td>
<td></td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td><strong>AVERAGE ANNUAL STRENOUS PHYSICAL ACTIVITY</strong></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td><strong>Long-term</strong></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td>&lt;5.5</td>
<td>424,329</td>
<td>73</td>
<td>Reference</td>
</tr>
<tr>
<td>≥5.5</td>
<td>1,064,062</td>
<td>202</td>
<td>1.03 (0.77-1.37)</td>
</tr>
<tr>
<td>5.5-16.4</td>
<td>355,292</td>
<td>71</td>
<td>1.10 (0.79-1.54)</td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>329,012</td>
<td>56</td>
<td>0.91 (0.63-1.32)</td>
</tr>
<tr>
<td>33.0+</td>
<td>379,757</td>
<td>75</td>
<td>1.08 (0.75-1.56)</td>
</tr>
<tr>
<td>Trend (p)</td>
<td></td>
<td></td>
<td>0.91</td>
</tr>
<tr>
<td><strong>Past 3 years</strong></td>
<td></td>
<td></td>
<td>Multivariable adjusted(^a)</td>
</tr>
<tr>
<td>&lt;5.5</td>
<td>753,141</td>
<td>132</td>
<td>Reference</td>
</tr>
<tr>
<td>≥5.5</td>
<td>735,250</td>
<td>143</td>
<td>1.07 (0.83-1.38)</td>
</tr>
<tr>
<td>5.5-16.4</td>
<td>231,147</td>
<td>41</td>
<td>0.97 (0.67-1.39)</td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>188,237</td>
<td>33</td>
<td>0.98 (0.66-1.45)</td>
</tr>
<tr>
<td>33.0+</td>
<td>315,866</td>
<td>69</td>
<td>1.24 (0.90-1.70)</td>
</tr>
<tr>
<td>Trend p</td>
<td>0.24</td>
<td>0.23</td>
<td></td>
</tr>
</tbody>
</table>

**AVERAGE ANNUAL MODERATE+STRENUOUS PHYSICAL ACTIVITY**
(MET-hours/week)

**Long-term**

| <5.5 | 256,838 | 53 | Reference | Reference |
| ≥5.5 | 1,231,553 | 222 | 0.77 (0.57-1.04) | 0.77 (0.57-1.04) |

5.5-16.4 431,698 77 0.78 (0.55-1.11) 0.78 (0.55-1.11)
16.5-32.9 417,536 76 0.76 (0.53-1.09) 0.76 (0.53-1.09)
33.0+ 382,318 69 0.76 (0.53-1.10) 0.76 (0.53-1.10)

**Past 3 years**

| <5.5 | 453,222 | 86 | Reference | Reference |
| ≥5.5 | 1,035,169 | 189 | 0.94 (0.73-1.22) | 0.94 (0.73-1.23) |

5.5-16.4 394,207 76 0.99 (0.73-1.36) 0.99 (0.73-1.35)
16.5-32.9 330,304 54 0.84 (0.60-1.19) 0.84 (0.60-1.19)
33.0+ 310,658 59 0.99 (0.71-1.38) 0.99 (0.71-1.39)

**Trend p**

| | 0.21 | 0.21 |

**BMI**: Body Mass Index

Stratified by age (years) and adjusted for categories of race (non-Hispanic White, Other/unknown) and oral contraceptive use (ever, never, unknown).

Additionally adjusted for BMI (<25, 25-29.9, ≥30 kg/m², unknown).

Moderate physical activity and strenuous physical activity mutually adjusted for each other.
Table 3. CTS Table 3. Relative risks for the association between physical activity and papillary thyroid cancer in 112,849 women aged less than 80 years with BMI reported in the California Teachers Study

<table>
<thead>
<tr>
<th>No. cases</th>
<th>Adjusted relative risk (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BMI&lt;25 kg/m²</td>
</tr>
</tbody>
</table>

AVERAGE ANNUAL MODERATE PHYSICAL ACTIVITY (MET-hours/week)³

**Long-term**

| <5.5 | 37 | 21 | Reference | Reference |
| 5.5-16.4 | 40 | 28 | 0.76 (0.48-1.19) | 0.97 (0.55-1.72) |
| 16.5-32.9 | 43 | 26 | 0.75 (0.48-1.18) | 0.93 (0.52-1.68) |
| 33.0+ | 41 | 33 | 0.62 (0.39-0.99) | 1.13 (0.64-1.99) |

Trend p 0.06 0.69
Homogeneity-of-trends p 0.12

**Past 3 years**

| <5.5 | 42 | 31 | Reference | Reference |
| 5.5-16.4 | 40 | 20 | 1.10 (0.71-1.71) | 0.84 (0.47-1.48) |
| 16.5-32.9 | 29 | 22 | 0.71 (0.44-1.15) | 1.06 (0.61-1.85) |
| 33.0+ | 50 | 35 | 0.72 (0.47-1.11) | 1.23 (0.75-2.03) |

Trend p 0.05 0.32
Homogeneity-of-trends p 0.04

AVERAGE ANNUAL STRENIOUS PHYSICAL ACTIVITY (MET-hours/week)³

**Long-term**

| <5.5 | 44 | 28 | Reference | Reference |
| 5.5-16.4 | 42 | 25 | 1.02 (0.67-1.57) | 1.06 (0.61-1.84) |
| 16.5-32.9 | 30 | 25 | 0.73 (0.45-1.17) | 1.22 (0.70-2.12) |
| 33.0+ | 45 | 30 | 0.87 (0.55-1.37) | 1.56 (0.91-2.70) |

Trend p 0.34 0.10
Homogeneity-of-trends p 0.04

**Past 3 years**

<p>| &lt;5.5 | 73 | 57 | Reference | Reference |
| 5.5-16.4 | 23 | 16 | Reference | Reference |
| 16.5-32.9 | 18 | 14 | 0.89 (0.56-1.44) | 0.97 (0.55-1.70) |
| 33.0+ | 47 | 21 | 0.79 (0.47-1.33) | 1.27 (0.70-2.32) |</p>
<table>
<thead>
<tr>
<th>BMI&lt;25 kg/m²</th>
<th>BMI≥25 kg/m²</th>
<th>BMI&lt;25 kg/m²</th>
<th>BMI≥25 kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. cases</td>
<td>Adjusted relative risk (95% Confidence Interval)</td>
<td>No. cases</td>
<td>Adjusted relative risk (95% Confidence Interval)</td>
</tr>
<tr>
<td>&lt;5.5</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>5.5-16.4</td>
<td>0.83 (0.53-1.30)</td>
<td>0.67 (0.37-1.20)</td>
<td></td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>0.59 (0.37-0.96)</td>
<td>1.05 (0.61-1.82)</td>
<td></td>
</tr>
<tr>
<td>33.0+</td>
<td>0.63 (0.39-1.02)</td>
<td>1.07 (0.60-1.88)</td>
<td></td>
</tr>
</tbody>
</table>

Trend $p$ 0.82 0.08

Homogeneity-of-trends $p$ 0.19

**AVERAGE ANNUAL MODERATE+STRENUOUS PHYSICAL ACTIVITY**
(MET-hours/week)

**Long-term**

<table>
<thead>
<tr>
<th>&lt;5.5</th>
<th>30</th>
<th>21</th>
<th>Reference</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5-16.4</td>
<td>51</td>
<td>24</td>
<td>0.83 (0.53-1.30)</td>
<td>0.67 (0.37-1.20)</td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>39</td>
<td>35</td>
<td>0.59 (0.37-0.96)</td>
<td>1.05 (0.61-1.82)</td>
</tr>
<tr>
<td>33.0+</td>
<td>41</td>
<td>28</td>
<td>0.63 (0.39-1.02)</td>
<td>1.07 (0.60-1.88)</td>
</tr>
</tbody>
</table>

Trend $p$ 0.03 0.35

Homogeneity-of-trends $p$ 0.03

**Past 3 years**

<table>
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<tr>
<th>&lt;5.5</th>
<th>49</th>
<th>37</th>
<th>Reference</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5-16.4</td>
<td>44</td>
<td>29</td>
<td>0.87 (0.58-1.31)</td>
<td>1.04 (0.64-1.70)</td>
</tr>
<tr>
<td>16.5-32.9</td>
<td>30</td>
<td>21</td>
<td>0.62 (0.40-0.99)</td>
<td>1.12 (0.65-1.91)</td>
</tr>
<tr>
<td>33.0+</td>
<td>38</td>
<td>21</td>
<td>0.77 (0.50-1.18)</td>
<td>1.52 (0.89-2.61)</td>
</tr>
</tbody>
</table>

Trend $p$ 0.11 0.16

Homogeneity-of-trends $p$ 0.04

BMI: Body Mass Index; number of cases are fewer than those indicated in Table 2 due to missing data on BMI status.

Stratified by age (years); adjusted for race (non-Hispanic White, Other/unknown) and oral contraceptive use (ever, never, unknown).

Moderate physical activity and strenuous physical activity mutually adjusted for each other.
Chapter II: Recent physical activity in relation to DNA damage and repair using the comet assay (Vitamins and Lifestyle study)

Abstract

Limited evidence suggests that very high-intensity exercise is positively associated with DNA damage but moderate exercise may be associated with DNA repair. Since excessive DNA damage is related to carcinogenesis, moderate physical activity may represent a means of lowering cancer risk. This study examined physical activity’s relation to DNA damage and repair among healthy older adults. Participants were 220 Washington State 50-76 year-olds in the validity/biomarker sub-study of the VITamins And Lifestyle (VITAL) cohort, who provided blood samples and completed questionnaires assessing recent physical activity and demographic and health factors. Measures included nested subsets of activity: total activity, moderate- plus high-intensity activity, and high-intensity activity. The comet assay was used to measure DNA damage (n=122) and repair (n=99). Multivariate linear regression was used to estimate regression coefficients and associated 95% confidence intervals (CIs) for relationships between MET-hours per week of physical activity and outcomes that included DNA damage (Olive tail moment measures) and DNA repair capacity (15-minute and 60-minute post-irradiation). DNA damage was not associated with total activity, moderate- plus high-intensity activity, or high-intensity activity. However, 60-minute DNA repair was positively associated with both total activity (β=0.21, 95% CI: 0.0057, 0.412; p=0.044) and high-intensity activity (β=0.31, 95% CI: 0.20, 0.60; p=0.036), adjusting for age, sex, BMI, and current multivitamin use. This study is the first to assess broad ranges of activity
intensity levels related to DNA damage and repair. Physical activity was unrelated to DNA damage but was associated with increased repair.

**Introduction**

DNA damage is associated with cancer risk\(^{53,54}\); thus, preventing DNA damage and increasing DNA repair may enhance cancer prevention. Of the modifiable factors that may protect against DNA damage or impaired DNA repair, physical activity is of particular interest, since higher levels of physical activity are associated with lower risk of various types of cancers, including breast\(^{26-29,55}\), colon\(^{56,57}\), and thyroid\(^{30}\) cancers.

Evidence from some animal studies suggests that regular exercise decreases DNA damage and increases DNA repair\(^{18,58}\). One study found that voluntary chronic physical activity on an exercise wheel was associated with elevated mitochondrial DNA template levels in mature (adult) mice\(^{18}\). No effect was observed in senescent mice, which the study authors attributed to lower running speeds of the aged mice\(^{18}\). However, another study has shown no association between short-term spontaneous exercise wheel running and DNA damage in the lymphocytes of adult mice\(^{59}\). A third study has shown DNA damage in muscle tissue of adult mice two days after spontaneous exercise on a wheel for an entire night (intense exercise)\(^{60}\). In terms of DNA repair, at least one study has shown regular exercise is beneficial – eight weeks of treadmill running resulted in increased repair in the muscle tissue of middle- and older-aged rats\(^{58}\).

Few studies have examined the relationship between physical activity and DNA damage and repair capacity in humans. In one of the first studies, white blood cells of three participants who ran at an increasing speed to exhaustion showed a pattern suggestive of
DNA damage in the single cell gel electrophoresis (SCG) assay (comet assay). On the other hand, when the participants were asked to run for 45 minutes at a constant speed, no DNA damage was observed\textsuperscript{61}. The authors concluded that physical activity above the aerobic-anaerobic threshold causes detectable white blood cell alterations\textsuperscript{61}. However, since the study was so small the ability to draw inferences is limited. Another study examined runners during an ultra-marathon and found DNA damage in lymphocytes mid-race, but the effect subsided two hours post-race\textsuperscript{62}. Thus, this evidence suggests that extremely high intensity physical activity may lead to DNA damage, at least in the short term.

The possibility of a threshold effect, whereby intense but not moderate activity may be positively associated with DNA damage, is a consistent theme in the literature. Although an approximately two- to three-fold increase in oxidative damage in muscle tissue has been noted following exhaustive exercise,\textsuperscript{63} this is not seen with moderate activity. In a randomized trial of short-term moderate and high intensity exercise programs in colorectal cancer patients, urinary excretions of 8-oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodG), a marker of oxidative DNA damage, were significantly decreased in the individuals completing the moderate intensity program and non-significantly increased in individuals completing the high intensity program\textsuperscript{64}. Similarly, another study found that urinary 8-oxodG excretions were significantly decreased among individuals performing moderate exercise (<5 hours per week)\textsuperscript{65}. In fact, investigators have proposed that exercise is related to DNA damage in a U-shaped fashion, whereby too little exercise may not confer benefit, and excessive intense exercise may cause DNA damage, but moderate exercise may protect against DNA damage\textsuperscript{66}. Body mass index (BMI) may also play a role in the relationships between physical
activity and DNA damage and repair. Several cross-sectional studies\textsuperscript{65,67} and at least one longitudinal study\textsuperscript{68} have found that BMI and urinary 8-oxdG excretions were inversely associated, but these relationships are still not well-understood.

The hypothesis of the present study was that physical activity is associated with reduced baseline DNA damage and increased DNA repair as measured by the comet assay in healthy older adults. Secondarily, an exploratory analysis investigated if these associations varied with BMI.

\textbf{Methods}

\textbf{Study population and data collection}

The VITamins And Lifestyle (VITAL) study is a prospective cohort study of 77,738 men and women in Washington State, aged 50-76 years at baseline, designed to examine the role of vitamins and other dietary supplements in relation to cancer risk. Baseline data were collected from October 2000 to December 2002 via a 24-page mailed, self-administered, sex-specific questionnaire. Questions assessed use of supplements, diet, physical activity, and health history\textsuperscript{69}. In addition, a sub-study was conducted among 220 participants and included a repeat baseline questionnaire, an in-home interview to obtain more detailed information on certain factors and collection of blood and other biospecimens for biomarkers\textsuperscript{70}. Data from this subsample assessment are used for the present analysis. The VITAL study was approved by the Fred Hutchinson Cancer Research Center institutional review board and is in accordance with an assurance filed with and approved by the U.S. Department of Health and Human Service and all participants signed written informed consent.

\textbf{Assessment of physical activity}
Physical activity data were collected via the repeat baseline questionnaire completed before the in-home visit. This was a version of the VITAL baseline physical activity questionnaire, modified to assess recreational physical activity over the prior month. Participants estimated by category how many days per week (1-2, 3-4, 5-7) and minutes per day (10-25, 30-40, 45-55, 60+) they participated in each of 13 types of activity, plus an “other” category. For analyses, the midpoint value of each category was assigned (e.g., 35 was assigned to the 30-40 minutes per day category), and a value of 65 was assigned to the category of 60+ minutes per week. For walking, participants estimated pace as follows: casual (30 minutes per mile or more), moderate (20-29 minutes per mile), or fast (19 minutes per mile or less). For missing data (<5%), age- (50-64, 65-75) and sex-specific values for minutes per day and days per week were imputed based on the most common response (the mode) for each strata. The number of flights of stairs climbed each day was also ascertained.

Metabolic equivalent task (MET) values were assigned to each of the activities (e.g., walking, running, swimming), based on Ainsworth et al.’s Compendium of Physical Activities. Activity-specific MET-hours per week for the 1-month time span were calculated: [(days per week)*(minutes per day)*(MET for activity)] ÷ [(60 minutes/hour)]. MET-hours per week were then summed across all activities for total MET-hours per week. Physical activity predictors were quantified as MET-hours per week of the following five groupings: walking, stair climbing, moderate plus high-intensity activity (for activities with MET values of 4 or higher, excluding walking), high-intensity activity (for activities with MET values of 6 or higher), and total activity (walking, stair climbing, moderate, and high
intensity activities combined).

**Assessment of baseline DNA damage and repair**

Semifasting (≥ 6 hours) blood samples were collected from participants by phlebotomists at the in-home interviews. All specimens were transported to the Fred Hutchinson Cancer Research Center Specimen Processing Laboratory and processed within two hours of collection. Viable leukocytes were isolated by Ficoll-gradient centrifugation, resuspended, and underwent controlled step-rate freezing. The cryovials with these specimens were placed in a -70°C freezer overnight and were transferred to liquid nitrogen storage vessels within 48 hours.

Baseline DNA damage was assessed using a single gel electrophoresis (SCG) assay (comet assay), which is a rapid, sensitive, and reliable technique to detect single and double strand breaks in DNA from individual cells\textsuperscript{72, 73}. Measurement of damage varies, but one common technique is the Olive tail moment, which is in measured in arbitrary units but is expressed as the difference between the tail mean and the head mean multiplied by the percent of DNA and divided by 100\textsuperscript{74}. A variation of the standard comet assay was used in this study to enable measurement of baseline DNA damage, response to oxidative stress-induced DNA damage, and repair capacity at two time points\textsuperscript{75}. Measuring both DNA damage and repair is an important feature, as it is ultimately the loss of equilibrium between damage and repair that promotes carcinogenesis\textsuperscript{76, 77}.

Cells were tested for viability using Trypan blue staining and cell morphology was examined. Samples were placed on ice to prevent repair until electrophoresis was conducted for each of the measures. Baseline DNA damage was measured for those samples having
viable cells, then the cells were subjected to 1.23 gray of gamma radiation at 4 degrees Celsius (9 seconds of exposure) to induce DNA damage. Repair capacity measurements were then taken at 15 minutes and 60 minutes post-induced damage and expressed as a percentage. For this study, 15-minute DNA repair capacity was considered to be 1 minus (the Olive tail moment at 15 minutes divided by the baseline Olive tail moment after irradiation), based on seminal comet assay work. An analogous calculation was made for DNA repair capacity at 60 minutes. Comet assays were conducted at the German Cancer Research Center (DKFZ), and values were measured using the Metafer4 system (MetaSystems, Altlussheim, Germany).

Although serum specimens were obtained for all 220 subsample participants, 35 were excluded from the comet assay analysis due to a previous cancer diagnosis (reported on their baseline questionnaire). There remained 122 participants with valid baseline DNA damage data after excluding 63 samples with non-viable lymphocytes or samples deemed ineligible for baseline damage analysis because fewer than 60 cells could be scored, ≥50% of cells were ‘ghost’ cells meaning no viable cells were present 24 hours after thawing. DNA repair capacity was not calculated when either the baseline damage or the residual damage from the induced damage was higher than the induced damage, because these measures were considered unreliable and likely due to laboratory measurement error. Of the 122 participants with baseline damage measures, all had data for at least one physical activity variable, and 99 had data available for the 15- and 60-minute DNA repair capacity assessments. The 23 individuals who had baseline damage measures but not repair measures were dropped from analyses due to the aforementioned exclusions at the repair measure time point.
**Statistical analyses**

Descriptive statistics were used to characterize the study population. Linear regression was used to estimate adjusted $\beta$-coefficients and 95% confidence intervals (95% CIs) for associations between MET-hours per week of physical activity and Olive tail moment measures of baseline DNA damage, 15-minute DNA repair, and 60-minute DNA repair. Total physical activity was considered the primary predictor, and components of total activity were also explored. Although there is no consensus on which repair measure (15-minute or 60-minute) is better, it has been observed in at least one study that cells can take as long as 30 minutes or more to repair\(^7\); thus, the 60-minute repair measure was emphasized *a priori* as the primary repair outcome, in order to capture as much repair as possible.

All models were *a priori* adjusted for age, sex, and BMI (continuous) given that they are known to be independently associated with both physical activity and DNA damage and repair\(^6,7\). For participants missing BMI (n=7), the BMI from their original baseline questionnaire was used if available (n=3). Additional covariates were evaluated in groups in order to construct a more parsimonious multivariate model and to have finals models that were more comparable to each other. Groups were formed by clustering similar variables and were included as follows: 1) demographic/behavioral: race (White, non-White), education (college or higher, less), current cigarette smoking (Y/N), current alcohol use (Y/N); 2) current multivitamin use (Y/N); 3) current antioxidant use: vitamin C (mg), vitamin E (mg dL alpha tocopherol), selenium (mcg); 4) current use of minerals/pro-oxidants: iron (mg), zinc (mg); 5) current use of fish oil, EPA, omega 3, or cod liver oil (Y/N), and 6) history of cardiovascular disease or diabetes (Y/N). Dose calculations for each of the vitamins and
supplements included amounts supplied by a multivitamin. The correlation matrix for variables within groups was examined to ensure that included variables were not highly correlated with each other. Each covariate group was added to the model for total activity and 60-minute DNA repair (main analysis) and evaluated for significance using a Likelihood ratio test. Only significant groups of variables were included in final models. For the main analysis of total activity and 60-minute DNA repair, the only additional predictor was multivitamin use; thus, all "final adjusted" analyses are adjusted for age, sex, BMI (continuous), and multivitamin use (Y/N).

In an exploratory analysis, BMI (<30.0, ≥30.0 kg/m²) was examined as a potential effect modifier. Multiplicative interaction terms were generated by creating a cross-product term between each physical activity measure and each BMI category and tested for significance in the univariate model using a likelihood ratio test.

All statistical significance levels (P values) reported are two-sided. P values of ≤0.05 were considered statistically significant. Statistical analyses were conducted using Stata/SE (version 11.0; StataCorp LP, College Station, TX).

**Results**

Demographic and health information for the 122 participants with complete information on at least one measure of reported physical activity and a measure of baseline DNA damage in the study sample are shown in Table 1 by sex. The majority of participants were non-Hispanic White (95.0%) and non-smokers (93.0%). Men were slightly more physically active than women; differences were most apparent for moderate-intensity, high-intensity, and total activity, while stair climbing and walking were similar between men and
women (Table 1). Men had a slightly higher mean BMI, and a higher proportion of men had a history of cardiovascular disease or diabetes (Table 1).

Table 2 displays the results of each of the five physical activity predictors and their relation to baseline DNA damage and 15-minute and 60-minute DNA repair capacity. Associations between baseline DNA damage and total activity, moderate- plus high-intensity activity, and high-intensity activity were small and not statistically significant.

Physical activity was not significantly associated with 15-minute DNA repair; however, total activity and high-intensity activity were each significantly associated with 60-minute DNA repair. When adjusting for age, sex, BMI, and current multivitamin use, total activity was positively associated with 60-minute DNA repair (p=0.044); for each additional MET-hour of physical activity per week, the mean DNA repair capacity was 0.21% higher (β=0.21, 95% CI: 0.0057, 0.42). Similarly, when adjusting for age, sex, BMI, and current multivitamin use, high-intensity activity was positively associated with 60-minute DNA repair (p=0.036); for each additional MET-hour of high-intensity activity per week, the mean DNA repair capacity was 0.31% higher (β=0.31, 95% CI: 0.20, 0.60). Moderate- plus high-intensity activity was associated with a non-significant 25% higher 60-minute DNA repair capacity (β=0.25, 95% CI: -0.0098, 0.51).

Given the small sample size of this study, there was limited power to detect effect modification by BMI. Thus, overall results (not separated by BMI status) have been presented.
**Discussion**

In this study of generally healthy, older adults in Washington State, physical activity was not associated with overall baseline DNA damage, but was associated with enhanced DNA repair. Meeting physical activity recommendations of 150 minutes per week\textsuperscript{80}, which is approximately equivalent to 7.5 MET-hours per week, would be associated with a 1.6% higher DNA repair capacity at 60 minutes. The benefit of total physical activity for DNA repair appears to be driven primarily by higher-intensity activities, such as running, swimming laps, or fast cycling. Given that DNA repair counteracts DNA damage, and excessive DNA damage is involved in carcinogenesis, these results are important because they demonstrate that physical activity may be beneficial for cancer prevention in older, healthy adults. Previous studies examining physical activity and DNA damage and repair have either used exhaustive treadmill tests to measure physical activity, or they have focused on aerobically trained individuals; however, this study used a measure of usual physical activity that allows for varying intensities of recreational physical activity. While a previous study showed that DNA damage was significantly decreased among individuals performing moderate exercise (<5 hours per week)\textsuperscript{65}, no association was observed in the present study. This study, however, is the first study to examine physical activity and DNA repair in humans and show that physical activity is associated with increased repair. These results are similar to the aforementioned study showing that eight weeks of treadmill training resulted in increased DNA repair in the muscle tissue of middle- and older-aged rats, which are more likely to perform moderate-intensity activity compared to high-intensity activity\textsuperscript{58}. The results of the present study are also consistent with another study showing that levels of 8-
oxoG-DNA glycosylase (OGG1), a base excision repair enzyme, increased in moderately- and strenuously-trained rats but not in rats trained at a higher intensity\textsuperscript{81}.

This study is one of only a handful of studies that have considered BMI as a potential confounding factor in the relationship between physical activity and DNA damage and repair. In one of the first small studies, BMI was accounted for via a crossover design; however this study only included three people\textsuperscript{61}. Allgayer et al.\textsuperscript{64} examined BMI as a potential confounder but it was not associated with their measure of DNA damage and thus was not considered a confounder. Kasai et al.\textsuperscript{65} included BMI in their multivariate analysis of moderate physical activity and urinary 8-oxodG excretion, but their study was restricted to men.

Biologically, physical activity may impact DNA repair through the creation and stimulation of oxygen radical scavenger enzymes and repair enzymes\textsuperscript{65}. It is possible that the action of such enzymes is delayed, which may help explain why an effect of physical activity on DNA repair was observed at 60 minutes but not at 15 minutes. The hypothesis of a non-immediate effect is consistent with the report from Mastaloudis et al.\textsuperscript{62} who observed that any damage induced during an ultra-marathon subsided to baseline levels two hours after the event.

This study has several strengths. It is the first study to assess how usual physical activity with a range of intensity and duration relates to baseline DNA damage and repair using the comet assay among older, more “average” activity level individuals. It is also the largest study to date to examine physical activity and baseline DNA damage and repair capacity in both men and women. The comet assay has been used extensively in
biomonitoring studies\textsuperscript{73,82,83} and more recently in epidemiologic investigations with reliable and reproducible results\textsuperscript{75,84}.

Nonetheless, this study has several limitations. Data on physical activity, BMI, and other demographic variables and potential confounders were assessed by self-report, and as such are subject to reporting error, including that due to social desirability\textsuperscript{85,86}. This is an observational, cross-sectional study, and it is possible that the observed association could be due to residual confounding. The sample size was too small to effectively examine effect modification by BMI. Finally, the majority of VITAL participants are non-Hispanic White and non-smokers, so results may not be generalizable to other subgroups of the population; however, the homogeneity offers a degree of control for confounding.

Although there are many assays available to assess DNA damage and the comet assay has its limitations, only one assay was able to be used in the present study, and the ability of the (relatively inexpensive) comet assay to rapidly and reliably simultaneously assess DNA damage and repair was an important feature in the current study. The statistical power to assess baseline DNA damage and repair was somewhat limited by the number of individuals with viable lymphocytes suitable for the comet assay. Nevertheless, an association was detected between physical activity and 60-minute DNA repair, and it was determined that participants who were included in the final analytic sample (i.e. those who had at least one comet assay measure) did not differ from participants who were excluded (i.e. those who did not have a comet assay measure) in terms of physical activity, demographics, and other measured characteristics.
In summary, recent physical activity does not appear to be associated with increased DNA damage as has been suggested by limited evidence in the literature. In fact, usual exercise may stimulate DNA repair, possibly though an oxygen radical scavenger enzyme or repair enzyme mechanism. In order to better assess the relationship between physical activity and DNA damage and repair, larger studies are needed, and particularly those that address remaining questions, including whether or not the associations observed vary by BMI. Nonetheless, our results are consistent with US Centers for Disease Control and Prevention physical activity guidelines for adults and older adults that a mix of moderate and vigorous physical activities is beneficial for health, and that some physical activity is better than none.

**Acknowledgments**

The authors would like to thank the participants of the VITAL study who made this investigation possible, and Dr. Peter Schemezer and the German Cancer Research Center (DKFZ) for conducting the comet assay. The work reported here was supported by R01 CA74846 and R03 CA105336 from the National Cancer Institute (NCI) of the National Institutes of Health (NIH).
Tables

Table 4. VITAL Table 1. Characteristics by sex for 122 participants with at least one physical activity measure and a measure of DNA damage in the VITAL study validity/biomarker sub-study

<table>
<thead>
<tr>
<th></th>
<th>Males N=67</th>
<th>Females N=55</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>63 (94.0)</td>
<td>53 (96.4)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (6.0)</td>
<td>2 (3.8)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than college graduate</td>
<td>24 (35.8)</td>
<td>30 (54.6)</td>
</tr>
<tr>
<td>College graduate or advanced degree</td>
<td>43 (64.2)</td>
<td>25 (45.5)</td>
</tr>
<tr>
<td><strong>Current Cigarette smoker</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (4.5)</td>
<td>5 (9.1)</td>
</tr>
<tr>
<td>No</td>
<td>64 (95.5)</td>
<td>50 (90.9)</td>
</tr>
<tr>
<td><strong>Alcohol in the past month</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>50 (75.8)</td>
<td>37 (67.3)</td>
</tr>
<tr>
<td>None</td>
<td>16 (24.2)</td>
<td>18 (32.7)</td>
</tr>
<tr>
<td><strong>History of diabetes or cardiovascular disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12 (17.9)</td>
<td>3 (5.5)</td>
</tr>
<tr>
<td>No</td>
<td>55 (82.1)</td>
<td>52 (94.5)</td>
</tr>
<tr>
<td><strong>Current multivitamin use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33 (49.3)</td>
<td>39 (70.9)</td>
</tr>
<tr>
<td>No</td>
<td>34 (50.8)</td>
<td>16 (29.1)</td>
</tr>
<tr>
<td><strong>Mean (SD)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>59.9 (7.5)</td>
<td>62.2 (7.8)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.6 (4.3)</td>
<td>25.3 (4.5)</td>
</tr>
<tr>
<td>MET-hours per week of walking</td>
<td>4.1 (5.0)</td>
<td>4.6 (5.1)</td>
</tr>
<tr>
<td>MET-hours per week of stair-climbing</td>
<td>2.3 (1.7)</td>
<td>1.9 (1.9)</td>
</tr>
<tr>
<td>MET-hours per week of moderate+high intensity activity</td>
<td>9.9 (14.7)</td>
<td>5.9 (9.2)</td>
</tr>
<tr>
<td>MET-hours per week of high intensity activity</td>
<td>6.8 (12.4)</td>
<td>3.3 (7.1)</td>
</tr>
<tr>
<td>MET-hours per week of total activity</td>
<td>18.7 (17.7)</td>
<td>13.5 (11.1)</td>
</tr>
<tr>
<td>Olive tail moment for baseline DNA damage</td>
<td>3.0 (2.7)</td>
<td>3.5 (3.7)</td>
</tr>
<tr>
<td>Olive tail moment for 15-minute DNA repair capacity (%)</td>
<td>38.4 (12.3)</td>
<td>40.1 (18.7)</td>
</tr>
<tr>
<td>Olive tail moment for 60-minute DNA repair capacity (%)</td>
<td>61.5 (13.9)</td>
<td>64.2 (15.7)</td>
</tr>
</tbody>
</table>

aN’s may not sum to 122 due to missing data, %’s may not sum to 100% due to rounding

BMI: Body Mass Index
Table 5. VITAL Table 2. Adjusted beta coefficients and 95% confidence intervals for the association between MET-hours per week of physical activity and baseline DNA damage and DNA repair capacity in the VITAL validity/biomarker sub-study

<table>
<thead>
<tr>
<th>Average MET-hours per week of physical activity</th>
<th>Model 1 – a priori adjusted a</th>
<th>Model 2 – final adjusted b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline DNA damage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking (n=120)</td>
<td>0.08 (-0.08, 0.24)</td>
<td>0.08 (-0.08, 0.23)</td>
</tr>
<tr>
<td></td>
<td>p=0.32</td>
<td>p=0.33</td>
</tr>
<tr>
<td>Stairs (n=122)</td>
<td>0.14 (-0.18, 0.46)</td>
<td>0.14 (-0.18, 0.46)</td>
</tr>
<tr>
<td></td>
<td>p=0.38</td>
<td>p=0.39</td>
</tr>
<tr>
<td>Moderate–+ high-intensity activity (n=120)</td>
<td>-0.02 (-0.06, 0.02)</td>
<td>-0.02 (-0.06, 0.01)</td>
</tr>
<tr>
<td></td>
<td>p=0.28</td>
<td>p=0.20</td>
</tr>
<tr>
<td>High-intensity activity (n=120)</td>
<td>-0.02 (-0.06, 0.02)</td>
<td>-0.03 (-0.07, 0.01)</td>
</tr>
<tr>
<td></td>
<td>p=0.29</td>
<td>p=0.20</td>
</tr>
<tr>
<td>Total activity (n=120)</td>
<td>-0.01 (-0.03, 0.02)</td>
<td>-0.01 (-0.04, 0.02)</td>
</tr>
<tr>
<td></td>
<td>p=0.70</td>
<td>p=0.62</td>
</tr>
<tr>
<td><strong>15-minute DNA repair capacity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking (n=97)</td>
<td>0.24 (-0.33, 0.82)</td>
<td>0.26 (-0.27, 0.80)</td>
</tr>
<tr>
<td></td>
<td>p=0.40</td>
<td>p=0.33</td>
</tr>
<tr>
<td>Stairs (n=99)</td>
<td>0.35 (-1.52, 2.22)</td>
<td>0.40 (-1.44, 2.25)</td>
</tr>
<tr>
<td></td>
<td>p=0.71</td>
<td>p=0.67</td>
</tr>
<tr>
<td>Moderate–+ high-intensity activity (n=97)</td>
<td>0.06 (-0.20, 0.33)</td>
<td>0.09 (-0.17, 0.36)</td>
</tr>
<tr>
<td></td>
<td>p=0.65</td>
<td>p=0.48</td>
</tr>
<tr>
<td>High-intensity activity (n=97)</td>
<td>0.07 (-0.25, 0.38)</td>
<td>0.10 (-0.21, 0.42)</td>
</tr>
<tr>
<td></td>
<td>p=0.67</td>
<td>p=0.53</td>
</tr>
<tr>
<td>Total activity (n=97)</td>
<td>0.02 (-0.20, 0.25)</td>
<td>0.03 (-0.20, 0.27)</td>
</tr>
<tr>
<td></td>
<td>p=0.86</td>
<td>p=0.78</td>
</tr>
<tr>
<td><strong>60-minute DNA repair capacity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking (n=97)</td>
<td>0.40 (-0.16, 0.94)</td>
<td>0.42 (-0.11, 0.95)</td>
</tr>
<tr>
<td></td>
<td>p=0.16</td>
<td>p=0.12</td>
</tr>
<tr>
<td>Stairs (n=99)</td>
<td>1.09 (-0.49, 2.67)</td>
<td>1.15 (-0.46, 2.75)</td>
</tr>
<tr>
<td></td>
<td>p=0.17</td>
<td>p=0.16</td>
</tr>
<tr>
<td>Moderate–+ high-intensity activity (n=97)</td>
<td>0.19 (-0.07, 0.46)</td>
<td>0.25 (-0.01, 0.51)</td>
</tr>
<tr>
<td></td>
<td>p=0.15</td>
<td>p=0.059</td>
</tr>
<tr>
<td>Activity Type</td>
<td>Adjusted for Weight</td>
<td>Adjusted for Age, Sex, and Weight</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>High-intensity activity (n=97)</td>
<td>0.25 (-0.05, 0.56)</td>
<td>0.31 (0.20, 0.60)</td>
</tr>
<tr>
<td></td>
<td>p=0.10</td>
<td>p=0.036</td>
</tr>
<tr>
<td>Total activity (n=97)</td>
<td>0.19 (-0.01, 0.39)</td>
<td>0.21 (0.01, 0.41)</td>
</tr>
<tr>
<td></td>
<td>p=0.065</td>
<td>p=0.044</td>
</tr>
</tbody>
</table>

BMI: Body Mass Index

*Adjusted for age, sex, and BMI (continuous)

*Adjusted for age, sex, and BMI (continuous), and multivitamin use (Y/N)
Chapter III: Associations of physical activity and sedentary behavior with obesity-specific quality of life: differences in associations by ethnicity/acculturation (the SESO Study)

Abstract

Obesity is associated with impaired health-related quality of life, but to what extent does this association apply to obesigenic behaviors such as physical activity? The Socioeconomic Status and Obesity (SESO) is a cohort study with 498 non-Hispanic White (NHW) women and 490 Hispanic women (of whom 79 were English- (ESH), and 392 were Spanish-speaking (SSH) in the home) who were aged 30-50 years at baseline. Demographic and behavior characteristics were assessed by self-administered questionnaire. Body mass index (BMI) was calculated from measured height and weight. In this analysis, multivariate linear regression was used to estimate associations between physical activity and sedentary time measures and log-transformed Obesity and Weight Loss Quality of Life (OWLQOL) scores adjusting for age and education, and additionally adjusting for dietary behaviors and BMI. Godin leisure-time activity score was positively associated with OWLQOL score in both NHW women and ESH women when controlling for age and education; using ordinal categories (<14, 14-23, and >23 units), a one-category increase in Godin score was associated with a geometric mean OWLQOL score 12% higher (95% CI: 5%, 20%; p=0.001) for NHW women and 22% higher (95% CI: 7%, 39%; p=0.004) for ESH women. Weekday sedentary time was negatively associated with OWLQOL score, after adjusting for age and education, among NHW women (p=0.019), and weekend sedentary time was negatively associated among both NHW women (p<0.001) and ESH women (p=0.039). Many of these associations were attenuated or accounted for when additionally adjusting for dietary
behaviors or BMI. Higher levels of physical activity and lower levels of sedentary time appear to be associated with higher obesity-specific quality of life to varying degrees among NHW, ESH, and SSH women. This is the first study to investigate ethnic differences in the relationship between physical activity and obesity-specific quality of life.

**Introduction**

The health benefits of physical activity have been recognized for decades, and researchers are now also beginning to appreciate the risks associated with sedentary behavior, even among those who are physically active\(^8\); however, a vast majority of the literature regarding physical activity and sedentary behavior focuses on physical health and neglects outcomes such as quality of life. As such, Healthy People 2010\(^8\) expanded its 2000 goal of longevity to include increased quality of life (QoL) and overall well-being\(^9\), and Healthy People 2020\(^9\) has emphasized this goal by including the promotion of health-related quality of life (HRQoL) as an overarching theme and new topic area\(^9\).

Measures of quality of life are intended to capture aspects of life experienced only by the individual reporting them, and represent how one feels his/her goals, standards, and concerns are affected by specific conditions and circumstances\(^9\). Several studies have found that obesity is associated with lower perceived QoL\(^9-98\), and a higher Body Mass Index (BMI) has been shown to be associated with impaired physical, social, and emotional domains of QoL\(^90,98\). Furthermore, measures specific to weight, such as the Impact of Weight on Quality of Life-Lite instrument\(^9\), have been used to demonstrate that individuals with higher BMIs were more likely to report impaired weight-related HRQoL\(^96,100\) and that weight loss is strongly related to improved weight-related HRQoL\(^101\). The relationship
between obesity and QoL may be bi-directional, in that obesity negatively affects perceived QoL, but lower perceived QoL can also predict future weight gain. Physical activity may be one way to modify QoL (e.g. through weight loss). Data from the 2001 Behavioral Risk Factor Surveillance System survey indicate that individuals who meet physical activity recommendations had significantly lower odds of reporting 14 or more mental and physical unhealthy days. Although anthropometric measures such as BMI, weight, and body fat may account for some portion of the relationship between physical activity and quality of life, data also suggest that physical activity is associated with improved QoL independent of BMI. For example, additional BRFSS data indicate that regardless of BMI, individuals who reported moderate or vigorous physical activity reported fewer physical and mental unhealthy days when compared to individuals reporting light physical activity. Similarly, a recent study examining physical activity and BMI in combination found that physical activity was the more important predictor of QoL, regardless of weight status, and in another study, adjustment for BMI merely attenuated the effect of physical activity on QoL. Furthermore, stratified analyses have shown that even among overweight/obese individuals, those who meet recommended physical activity levels report higher QoL compared to their inactive counterparts. Nonetheless, studies regarding the association between physical activity and obesity-specific quality of life are few, but may provide important detail in interpreting the association with health-related variables, beyond the broad general construct of QoL.

Research also suggests that ethnic differences in reporting of QoL and body satisfaction exist. A recent study in adolescents demonstrated that Caucasians are at
an elevated risk of reporting lower weight-related quality of life compared to Mexican-Americans\textsuperscript{110}. Another study showed that among obese individuals, Hispanics report fewer mental and physical unhealthy days than their non-Hispanic White (NHW) counterparts, with the difference being more pronounced at higher BMIs\textsuperscript{106}, suggesting one interpretation that weight may have a larger impact on quality of life for NHWs compared to Hispanics. Similarly, Lopez et al.\textsuperscript{111} found that while non-Hispanic White and more acculturated Hispanic women reported a similar degree of body dissatisfaction, less acculturated Hispanic women reported decreased body dissatisfaction compared to White women\textsuperscript{111}. The authors concluded that as Hispanic women acculturate, their behavior and body image may be more strongly influenced by the dominant culture, and their level of body dissatisfaction may increase\textsuperscript{111}. Indeed, body image, acceptance, and ideals of individuals in a specific race or ethnic group are likely related to broader, culture-wide beliefs and norms. Researchers have found that the perception of normal body weight within low-SES Puerto Rican women greatly exceeds the definition of normal weight according to medical standards\textsuperscript{113}, and larger women are considered healthy and more attractive in many Latin American and African traditional cultures compared to European and European descendant cultures\textsuperscript{114}.

To date, only one study has examined ethnic differences in the relationship between physical activity and QoL; Luncheon and Zack (2011)\textsuperscript{115} found that physical activity was associated with fewer reported physical unhealthy, mental unhealthy, recent activity limitation, and overall unhealthy days in White women, compared to only fewer reported overall unhealthy days in Latinas, independent of BMI\textsuperscript{115}; however, no formal interaction test results were reported, and the study measured general quality of life rather than obesity-
specific quality of life. Thus, the present study aims to fill some of these gaps by examining the association between physical activity and obesity-specific quality of life in a population of NHW and Hispanic adult women. In particular, it further evaluates any change in effect estimate when adjusting for BMI. The hypothesis is that higher levels of physical activity and lower levels of sedentary time are associated with higher reported obesity-specific quality of life, and that this relationship persists even when adjusting for BMI. Secondarily, potential differences in observed associations based on levels of ethnicity/acculturation, as measured by ethnicity and language spoken in the home, will be investigated. The hypothesis is that the associations of physical activity and sedentary time with obesity-specific quality of life would be stronger for non-Hispanic White women, for whom lean body mass appears to be more desirable.

**Methods**

**Study population and data collection**

The Socioeconomic Status and Obesity (SESO) study is a longitudinal cohort study aiming to elucidate the pathways between socioeconomic status (SES) and obesity by examining social, environmental, psychological, and biological factors in relation to weight and weight change. Non-Hispanic White (NHW) (n=510) and Hispanic (n=530) Seattle women were recruited through multi-stage sampling, using block groups stratified by income and education as of the 2000 census as primary sampling unit. Segments of contiguous dwelling units were defined within block groups, and segments were sampled for the next stage. Within the selected segments, more than 25,000 households were approached by study staff, and approximately 20,000 households were screened, and eligible women were
stratified by years of education. Eligibility criteria included being 30-50 years old and an expectation that women would not move their home residence for three years. A stratified sample of eligible and interested women was drawn, with sampling fractions dependent on ethnicity and education stratum. Because women with fewer years of education had a higher sampling fraction within the NHW ethnicity, the overall eligibility rate was 10.5%, but the cooperation rate\textsuperscript{116} was 72.5% yielding a joint response rate of 41.9%. 1,040 women were successfully enrolled in the study, exceeding the target of 1,000 women. In these analyses, women were excluded from analyses if they did not fall within the target age range of 30-50 years at the time of the baseline survey (n=22) or if they had missing information for age (n=30). This resulted in an analytic sample of 988 women.

The SESO study includes a baseline assessment and two annual follow-up assessments, each of which involves the following: wearing an accelerometer for a 7-day period; completion of a comprehensive self-administered questionnaire assessing physical activity, dietary, psychosocial, health, and demographic factors; and measured height and weight. The questionnaire was offered in both English and Spanish versions. Data for the present study used only baseline data, collected from May 2010 through September 2011.

**Assessment of physical activity and sedentary time**

A number of physical activity measures were assessed in the baseline questionnaire. The primary measure of physical activity for this study was leisure-time activity of at least 10 minutes, assessed using a modified Godin leisure-time exercise questionnaire\textsuperscript{117}, which asked about the frequency during a typical 7-day period of strenuous, moderate, and mild exercise (assessed separately), which were then weighted using approximate metabolic equivalents
(METs) of 9, 5, and 3 respectively\textsuperscript{117-119}. A total weighted score can be calculated by summing weighted frequencies across all three categories; however, given that mild activity contributes minimally to various health outcomes, we calculated a total score based on the contributions of moderate and strenuous activity only, in accordance with Godin’s updated recommendation\textsuperscript{119}. This approach has also been used by others\textsuperscript{120,121}. It was assumed that a woman may not have filled in responses for categories for which she did no activity; thus for a woman who answered either moderate or strenuous activity an overall score was calculated using the reported frequency for the completed, and zero frequency for the missing, response.

Godin score was also categorized according to the following recommended cutpoints by Godin\textsuperscript{119} based on the Surgeon General’s recommended physical activity levels\textsuperscript{122}: <14 units (<7 kcal/kg/week), 14-23 units (7-13.9 kcal/kg/week), and >23 units (>14 kcal/kg/week). A separate question, not factored into the total score, asked about frequency of engaging in sweat-inducing free-time activity in a typical 7-day period (often, sometimes, never/rarely)\textsuperscript{123}. Godin and Shephard have demonstrated the reliability and validity of their measure of leisure-time activity in relation to maximal oxygen consumption (VO\textsubscript{2} max)\textsuperscript{118}.

Total walking was assessed using two questions from the short-form International Physical Activity Questionnaire, a reliable and valid measure of physical activity\textsuperscript{124}. A primary question asked about the number days per week during the past 7 days a woman walked for a least 10 minutes at a time for any purpose (e.g. recreation, transportation). A secondary question asked how many hours and minutes she usually walked on one of those days. Reported hours were multiplied by 60 minutes and summed with reported minutes to create a variable for minutes per day. This minutes per day variable was multiplied by days
per week to create a total minutes per week variable. As per the International Physical Activity Questionnaire (IPAQ) scoring protocol, for minutes per day, values above 180 were truncated to 180. Similarly, values for minutes per week above 1,260 (based on 180 minutes per day for 7 days a week) were truncated to 1,260.

Time spent sitting (sedentary time) was evaluated using two questions from the long-form IPAQ\textsuperscript{124,125}. Participants reported hours and minutes usually spent sitting in a day during the past 7 days. One question asked about weekday sitting and the other asked about sitting on weekend days. Similar to the IPAQ-short walking questions, reported hours were multiplied 60 and summed with reported minutes to create a variable for minutes spent sitting per day. This variable was created separately for weekdays and for weekend days. As per IPAQ scoring protocol, values for sitting minutes per day above 960 were truncated to 960, based on the assumption that 16 hours of the day could be spent doing activities other than sleeping (8 hours).

Walking in the neighborhood was also assessed using a slightly modified version of Giles-Corti et al.’s Neighborhood Physical Activity Questionnaire, a reliable and valid measure of walking in the neighborhood\textsuperscript{126}. Test-retest reliability was reported to be strong (kappa=0.84, percent agreement = 94\%)\textsuperscript{126}. In the current study, questions about days per week and minutes per day of walking in the neighborhood were modified to ask about walking during the last 7 days, rather than usual activity, to be more comparable to the IPAQ walking questions. Analyses of the IPAQ have shown that reliability and validity estimates are comparable for the “usual week” and “7 days” versions\textsuperscript{124}. A separate question also assessed how many minutes per day a woman walked in her neighborhood on a typical day.
Assessment of obesity-specific quality of life

Obesity-specific quality of life was measured using the Obesity and Weight Loss Quality of Life (OWLQOL) Questionnaire\textsuperscript{127,128}, a 17-item self-administered questionnaire developed cross-culturally based on Maslow’s theory of human needs\textsuperscript{129}. All items address unobservable but fundamental needs such as freedom from stigma and attainment of culturally-appropriate goals. For example, the OWLQOL asks the degree to which weight affects respondent’s energy. Reliability and validity are well-established and have exceeded recommended minimum values within obese populations\textsuperscript{130}. The Guttman-Cronbach’s $\alpha$ of 0.96, indicates high internal consistency, and factor analyses supports a single factor\textsuperscript{130}. The overall OWLQOL score, the primary outcome measure, was calculated and used in continuous form after log-transformation to reduce skewness for analyses; the values were then back-transformed for presentation.

Assessment of demographic and health factors

During the screening interview, participants reported information on ethnicity (NHW, Hispanic) and highest level of education completed (less than high school (HS), HS graduate or equivalent, some college, bachelor’s degree, graduate or professional degree). If screening data were not available for these variables, baseline survey responses were substituted ($n=15$, 1.4\% for ethnicity; $n=118$, 11.3\% for race; and $n=14$, 1.3\% for education) in the analysis. No participant lacked information on ethnicity, since it was an important factor in defining the eligible cohort. Data on additional demographic factors were collected in the baseline survey and included date of birth (from which age was calculated), country of birth, and primary language spoken. A combined ethnicity/acculturation variable was defined and referred to in
this paper as a woman’s ethnicity and “acculturation” status, which was defined by primary
language spoken in the home (English, Spanish); resulting categories for this
ethnicity/acculturation variable were as follows: NHW women, English-speaking Hispanic
women, and Spanish-speaking Hispanic women.

Health and dietary behaviors were also collected in the baseline survey. Participants
were asked whether or not they had smoked at least 100 cigarettes in their lifetime. Dietary
factors such as servings of fruits and vegetables per day, fast food meals per month,
frequency of consuming soft drinks (diet or regular), and frequency of eating while engaging
in another activity (e.g. watching television, working) were also assessed. Body Mass Index
(BMI, kg/m²) was calculated using height and weight measured in the home with a calibrated
study stadiometer and scale.

Statistical analyses

Linear regression was used to estimate regression coefficients and 95% confidence
intervals (CIs) between each of the continuous physical activity variables and continuous,
log-transformed OWLQOL score. The interpretation of regression results that use a log-
transformed outcome is that a particular unit change in the predictor is associated with a
particular unit change in the geometric mean of the outcome, where the geometric mean is
simply the mean of a log-transformed variable. Regression results using this method are
hereafter referred to as the linear effect estimate. The interquartile range (IQR) for each
physical activity predictor was calculated for the overall study sample (NHWs and Hispanics
combined), and regression results are presented as the back-transformed version of the
product between the beta coefficient and the IQR, with similar calculations conducted for the lower and upper CI limits.

Multiple imputation ($m=20$) using iterative Markov chain Monte Carlo methods was employed to impute values for missing physical activity and sedentary time variables based on models that included OWLQOL score and all aforementioned covariates; this method has been shown to be less biased than complete case analysis approaches$^{131}$. Missingness was most problematic for Spanish-speaking Hispanic women, and ranged from 1.8% to 21.7% depending on the physical activity measure of interest (Supplementary Table 1). Missingness in physical activity and sedentary time variables was not assumed to be Missing Completely at Random (MCAR), but was assumed to be Missing at Random (MAR) given that missingness was associated with factors such as Hispanic ethnicity, education, and primary language spoken. Similar observations and decisions have been noted in at least one other study$^{132}$. Imputation accounted for factors observed to be associated with missingness. We acknowledge that this is an assumption that inherently presumes no additional selection bias impacted missing data.

Age (continuous) and education (less than high school, high school graduate or equivalent, some college or associates degree, bachelor’s degree, graduate or professional degree) were considered a priori confounders. Additional covariates, which were selected based on factors associated with both physical activity and quality of life in the literature, were then tested in groups for significant (Wald $p<0.05$) contribution to the a priori model between Godin score and log-transformed, continuous OWLQOL score using a multiply imputed data post-estimation F-test. Variables were clustered according to the following
groups: 1) additional demographic variables: marital status (never married, divorced or separated, widowed or presently married, or living in a marriage-like relationship) and household income (<$25,000, $25,000-$49,999, $50,000-$74,999, $75,000-$99,999, $100,000+, don’t know); 2) dietary behaviors: servings of fruits and vegetables (<1, 1-2, 3-4, 5+), fast food meals per month (zero, 1-4, 5-9, 10+), frequency of drinking regular or diet soft drinks/soda (never, less than once a week, about once a week, 2-5 times per week, about once a day, 2+ times a day), and eating while doing another activity (never, seldom, sometimes, most of the time/always); and 3) smoking history: smoked 100 cigarettes in lifetime (yes, no). BMI was also considered a covariate in the final model. Main analyses were conducted as follows: 1) adjusted for a priori demographic covariates (Model 1); 2) Model 1 additionally adjust for dietary behavior covariates found to be significant additions to Model 1; 3) Model 1 plus BMI; and 4) Model 1 plus significant dietary predictors and BMI.

In exploratory analyses, effect modification was investigated using a Wald test to test the coefficient of a multiplicative term between categorical Godin score (the primary physical activity predictor) and ethnicity/acculturation in a univariate model (not adjusting for covariates). A likelihood ratio test was not used given that physical activity values were imputed prior to testing for effect modification and running analyses, and the use of likelihood estimation in a multiple imputation setting does not have clear interpretation. Analyses were restricted to women with complete information on OWLQQL score and ethnicity/acculturation (n=969) and were conducted separately for NHW women (n=498), English-speaking Hispanic women (n=79), and Spanish-speaking Hispanic women (n=392).
since ethnicity/acculturation modified the association between categorical Godin score and continuous, log-transformed OWLQOL score.

All statistical tests were two-sided. Statistical analyses were conducted using Stata/IC (version 11.0; StataCorp LP, College Station, TX).

**Results**

Demographic information and behavioral and health characteristics for the 969 women with complete information for an Obesity and Weight Loss Quality of Life (OWLQOL) score, primary language spoken, and at least one measure of reported physical activity prior to imputation, are shown in Table 1. All results are presented separately for NHW women, English-speaking Hispanic women, and Spanish-speaking Hispanic women since ethnicity/acculturation modified the association between categorical Godin leisure time exercise score and continuous, log-transformed OWLQOL score (Wald test: p=0.031. Non-Hispanic White (NHW) women had more years of education and higher household incomes compared to Hispanic women (Table 1). NHW women were primarily born in the United States, whereas Spanish-speaking Hispanic women were primarily born in Mexico; similarly, the proportion of English-speaking Hispanic women born in the US was higher than that for English-speaking Hispanic women born in Mexico. A lower proportion of Spanish-speaking Hispanic women than NHW women had smoked 100 cigarettes and a higher proportion were overweight or obese. Godin leisure-time exercise scores and walking were similar between NHW and English-speaking Hispanic women, but NHW women reported greater sitting time.
Table 2 displays the results of each of the Godin physical activity predictors (after imputation) and their relation to OWLQOL score. Godin score was positively associated with OWLQOL score in both NHW women and English-speaking Hispanic women when controlling for age and education. Comparing two NHW women in adjacent categories of ordinal Godin score (<14, 14-23, and >23 units), women who performed activity consistent with a higher category had a 12% higher linear effect estimate of OWLQOL score (95% CI: 5%, 20%; p=0.001) than women who performed activity consistent at one category lower. However, this significant association disappeared when additionally adjusting for either BMI or dietary behaviors. Similarly, comparing two English-speaking Hispanic women in adjacent categories of ordinal Godin score as above, women who performed activity consistent with a higher category had a 22% higher linear effect estimate of OWLQOL score (95% CI: 7%, 39%; p=0.004) than the women who performed activity consistent at one category lower; unlike NHW, this association persisted when additionally adjusting for BMI or dietary behaviors. For Spanish speaking women, only frequency of engaging in sweat-inducing activity was associated with OWLQOL score when adjusting for age and education; comparing two women engaging in sweat-inducing exercise “often” compared to “sometimes”, or “sometimes” compared to “never/rarely”, the woman with a higher frequency of sweat-inducing had a linear effect estimate of OWLQOL score that was 10% higher (95% CI: 2%, 19%; p=0.010) than that for the women engaging in sweat-inducing exercise less often. This association was independent of BMI but not independent of dietary behaviors.
Table 3 displays the results of walking and sedentary time predictors (after imputation) and their relation to OWLQOL score. Minutes of neighborhood walking in a typical day was not associated with OWLQOL score in NHW women, but was positively associated with OWLQOL score in English-speaking Hispanic women; an additional 25 minutes of neighborhood walking per day was associated with a 12% higher OWLQOL linear effect estimate (95% CI: 1%, 24%; p=0.040). This association persisted when adjusting for BMI but disappeared when adjusting for dietary behaviors.

Weekday sedentary time was negatively associated with OWLQOL score among NHW women when controlling for age and education; an additional 300 minutes (5 hours) of sedentary time per weekday was associated with a 9% lower linear effect estimate (95% CI: 2%, 16%; p=0.019) for NHW women. Weekend sedentary time was negatively associated with OWLQOL score among both NHW women and English-speaking Hispanic women when controlling for age and education; an additional 180 minutes (3 hours) of weekend day sitting time was associated with a linear effect estimate that was 10% lower (95% CI: 5%, 15%; p<0.001) for NHW women and 13% lower (95% CI: 1%, 24%; p=0.039) for English-speaking Hispanic women. However, the only significant association that was independent of dietary behaviors was that observed within NHW women, and significant associations disappeared when adjusting for BMI.

Among Spanish-speaking Hispanic women, total walking and neighborhood walking were not significant predictors of OWLQOL score in models that only adjusted for age and education. When further adjusting only for BMI, weekly neighborhood walking time (p=0.045), typical daily neighborhood walking time (p=0.035), weekday sedentary time
(p=0.022), and weekend sedentary time (p=0.016) became statistically significant. For example, daily neighborhood walking was positively associated with OWLQOL score when controlling for age, education, and BMI; an additional 25 minutes of daily neighborhood walking was associated with a 5% higher linear effect estimate for OWLQOL score (95% CI: 0%, 10%; p=0.035) within Spanish-speaking Hispanic women. However, these significant associations disappeared when further adjusting for dietary behaviors.

**Discussion**

In this study of 969 women in the SESO Study, higher levels of physical activity and lower levels of sedentary time were associated with higher obesity-specific quality of life independent of age and education. These associations were stronger among Non-Hispanic White (NHW) women and English-speaking Hispanic women than among Spanish-speaking Hispanic women. For Godin measures of physical activity, associations in NHW largely disappeared when adjusting for body mass index (BMI), associations in Spanish-speaking women largely disappeared when adjusting for dietary predictors, and associations in English-speaking Hispanic women persisted independent of both dietary behaviors and BMI. Similarly, any associations for walking or sedentary time were diminished when adjusting for dietary behaviors or BMI. The results presented demonstrate that while physical activity and reduced sedentary time are likely important correlates of higher quality of life, much of the inverse association, if causal, may operate through BMI for NHW women; in contrast, there may be a residual association between physical activity and higher quality of life for English-speaking Hispanic women that is independent of BMI and dietary behaviors.
Previous studies examining physical activity and quality of life have either not examined obesity-specific quality of life or have not investigated potential ethnic and acculturation differences in associations. This study contributes important information about how the associations between physical activity or sedentary behavior and obesity-specific quality of life differ based on combined ethnicity/acculturation. Furthermore, the data presented here provide support for the contention that any association of physical activity is accounted for by BMI among NHW women, but not necessarily among Hispanic women.

Results from this study are similar to those of Luncheon and Zack(2011) who examined ethnic differences in the relationship between physical activity and generic health-related QoL and found that physical activity was associated more with measures of unhealthy days in White women compared to Latinas; however, their study showed that the association of physical activity with measures of quality of life after adjustment for BMI, whereas in the present study, this was largely only true for English-speaking Hispanic women. In addition, the present study reported formal interaction test results, whereas Luncheon and Zack did not.

This study has several strengths. It is the first study to assess how activity is related to obesity-specific quality of life in a large cohort study of both NHW and Hispanic women. The large number of women in the study allowed for investigation of differences in associations based on a measure that combines ethnicity/ and acculturation (combined ethnicity and primary language spoken). By using a number of various physical activity measures, the baseline survey was able to capture associations with a range of activities, including sweat-inducing activities, walking (both total walking and neighborhood walking),
and sitting behavior.

Nonetheless, this study has several limitations. Physical activity in the current study was assessed by self-report survey data and is thus subject to reporting error; on the other hand, physical activity questions included in the surveys were well-validated\textsuperscript{118, 124, 126}. Missingness was high for some physical activity measures, particularly for Spanish-speaking Hispanic women; however, multiple imputation was used, and sensitivity analyses revealed that results from multiply-imputed data models were similar to those without imputation that excluded women with missing data. This study did not assess occupational or household physical activity, which could be important determinants of total energy expenditure\textsuperscript{28, 52}. Data are cross-sectional, limiting our ability to draw inferences about causality. Finally, it should be noted that findings are restricted to women, and should not be generalized to men.

In summary, physical activity appears to be positively associated with obesity-specific quality of life independent of age and education. This association is strongest in NHW women, but disappears when adjusting for BMI, perhaps speaking to the importance of body image among NHW women. On the other hand, for English-speaking Hispanic women, physical activity is positively associated with quality of life independent of BMI and dietary behaviors, perhaps due to mechanisms not involving actual weight or obesity status. In order to better understand the mechanisms behind improved obesity-specific quality of life, longitudinal analyses are needed to assess whether increasing physical activity levels and reducing sedentary time can be used to increase obesity-specific quality of life, particularly among Non-Hispanic Whites and Hispanics.
Acknowledgements

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Table 6. SESO Table 1. Baseline characteristics for 969 women in the SESO Study with data on ethnicity/acculturation, at least one measure of reported physical activity (prior to imputation), and a measure of Obesity and Weight Loss Quality of Life (OWLQOL)

<table>
<thead>
<tr>
<th></th>
<th>Non-Hispanic White women (N=498)</th>
<th>English-speaking Hispanic women (N=79)</th>
<th>Spanish-speaking Hispanic women (N=392)</th>
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<tbody>
<tr>
<td><strong>Education</strong></td>
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<td>Less than high school</td>
<td>10 (2.0)</td>
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<td>High school graduate or equivalent</td>
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<td>19 (24.1)</td>
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<td>Some college / associates degree</td>
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<td>29 (36.7)</td>
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<td>Bachelor’s degree</td>
<td>146 (29.3)</td>
<td>18 (22.8)</td>
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<td>Graduate or professional degree</td>
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<td>7 (8.9)</td>
<td>2 (0.50)</td>
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<td><strong>Annual household income</strong></td>
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<td>16 (21.3)</td>
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<td>89 (18.1)</td>
<td>15 (20.0)</td>
<td>120 (32.7)</td>
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<td>$75,000-$99,999</td>
<td>89 (18.1)</td>
<td>11 (14.7)</td>
<td>2 (0.54)</td>
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<td>$100,000+</td>
<td>114 (23.2)</td>
<td>7 (9.3)</td>
<td>2 (0.27)</td>
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<td>Don’t know</td>
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<td>5 (6.7)</td>
<td>59 (16.1)</td>
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<td><strong>Marital status</strong></td>
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<td>Divorced or separated</td>
<td>60 (12.1)</td>
<td>11 (14.1)</td>
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<td>244 (62.4)</td>
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<td>10 (12.8)</td>
<td>71 (18.2)</td>
</tr>
<tr>
<td><strong>Country of birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>473 (95.0)</td>
<td>55 (69.6)</td>
<td>8 (2.1)</td>
</tr>
<tr>
<td>Mexico</td>
<td>1 (0.2)</td>
<td>14 (17.7)</td>
<td>314 (84.2)</td>
</tr>
<tr>
<td>Other</td>
<td>24 (4.8)</td>
<td>10 (12.7)</td>
<td>51 (34.7)</td>
</tr>
<tr>
<td><strong>Smoked at least 100 cigarettes in lifetime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>248 (50.2)</td>
<td>40 (51.3)</td>
<td>324 (87.1)</td>
</tr>
<tr>
<td>Yes</td>
<td>246 (49.8)</td>
<td>38 (48.7)</td>
<td>48 (12.9)</td>
</tr>
</tbody>
</table>
### Servings of fruits and vegetables per day

<table>
<thead>
<tr>
<th>Servings</th>
<th>&lt;1</th>
<th>1-2</th>
<th>3-4</th>
<th>5+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 (0.8)</td>
<td>153 (30.9)</td>
<td>208 (42.0)</td>
<td>130 (26.3)</td>
</tr>
<tr>
<td></td>
<td>0 (0.0)</td>
<td>29 (36.7)</td>
<td>35 (44.3)</td>
<td>15 (19.0)</td>
</tr>
<tr>
<td></td>
<td>9 (2.4)</td>
<td>206 (54.2)</td>
<td>118 (31.1)</td>
<td>47 (12.4)</td>
</tr>
</tbody>
</table>

### Fast food meals per month

<table>
<thead>
<tr>
<th>Meals per month</th>
<th>Zero</th>
<th>1-4</th>
<th>5-9</th>
<th>10+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>178 (36.0)</td>
<td>238 (48.1)</td>
<td>44 (8.9)</td>
<td>35 (7.1)</td>
</tr>
<tr>
<td></td>
<td>23 (30.0)</td>
<td>38 (49.4)</td>
<td>11 (14.3)</td>
<td>5 (6.5)</td>
</tr>
<tr>
<td></td>
<td>49 (13.4)</td>
<td>262 (71.4)</td>
<td>32 (8.7)</td>
<td>24 (6.5)</td>
</tr>
</tbody>
</table>

### Frequency of drinking soft drinks/soda (regular or diet)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Never</th>
<th>Less than once a week</th>
<th>About once a week</th>
<th>2-5 times per week</th>
<th>About once a day</th>
<th>2+ times per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>97 (19.5)</td>
<td>172 (34.6)</td>
<td>53 (10.7)</td>
<td>66 (13.2)</td>
<td>56 (11.3)</td>
<td>53 (10.7)</td>
</tr>
<tr>
<td></td>
<td>12 (15.4)</td>
<td>23 (29.5)</td>
<td>12 (15.4)</td>
<td>17 (21.8)</td>
<td>6 (7.7)</td>
<td>8 (10.3)</td>
</tr>
<tr>
<td></td>
<td>42 (11.1)</td>
<td>86 (22.6)</td>
<td>98 (25.8)</td>
<td>74 (19.5)</td>
<td>53 (14.0)</td>
<td>27 (7.1)</td>
</tr>
</tbody>
</table>

### Frequency of eating while doing another activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Most of the time / always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 (2.0)</td>
<td>73 (14.7)</td>
<td>216 (43.6)</td>
<td>197 (39.7)</td>
</tr>
<tr>
<td></td>
<td>4 (5.1)</td>
<td>15 (19.0)</td>
<td>36 (45.6)</td>
<td>24 (30.4)</td>
</tr>
<tr>
<td></td>
<td>50 (13.3)</td>
<td>117 (31.2)</td>
<td>147 (39.2)</td>
<td>61 (16.3)</td>
</tr>
</tbody>
</table>

### BMI (kg/m²)

<table>
<thead>
<tr>
<th>BMI</th>
<th>&lt;25.0</th>
<th>25.0-29.9</th>
<th>≥30.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>188 (37.8)</td>
<td>112 (22.5)</td>
<td>197 (39.6)</td>
</tr>
<tr>
<td></td>
<td>15 (19.0)</td>
<td>26 (32.9)</td>
<td>38 (48.1)</td>
</tr>
<tr>
<td></td>
<td>46 (11.8)</td>
<td>153 (39.2)</td>
<td>191 (49.0)</td>
</tr>
</tbody>
</table>

### Godin leisure-time exercise score

<table>
<thead>
<tr>
<th>Exercise</th>
<th>&lt;14 units (&lt;7 kcal/kg/week)</th>
<th>14-23 units (7-13.9 kcal/kg/week)</th>
<th>&gt;23 units (&gt;14 kcal/kg/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>114 (23.7)</td>
<td>107 (22.2)</td>
<td>261 (54.2)</td>
</tr>
<tr>
<td></td>
<td>19 (26.0)</td>
<td>11 (15.1)</td>
<td>43 (58.9)</td>
</tr>
<tr>
<td></td>
<td>124 (38.5)</td>
<td>66 (20.5)</td>
<td>132 (41.0)</td>
</tr>
</tbody>
</table>

### Godin frequency of engaging in sweat-inducing exercise

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Never/rarely</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>143 (29.1)</td>
<td>244 (49.7)</td>
<td>104 (21.2)</td>
</tr>
<tr>
<td></td>
<td>20 (26.0)</td>
<td>33 (42.9)</td>
<td>24 (31.2)</td>
</tr>
<tr>
<td></td>
<td>143 (37.1)</td>
<td>170 (44.2)</td>
<td>72 (18.7)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>Median (IQR)</td>
<td>Median (IQR)</td>
<td>Median (IQR)</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Godin leisure-time exercise score (^b)</td>
<td>24.0 (27.0)</td>
<td>30.0 (26.0)</td>
<td>15.0 (28.0)</td>
</tr>
<tr>
<td>Minutes per week of total walking in past 7 days (^b)</td>
<td>140.0 (315.0)</td>
<td>202.5 (320.0)</td>
<td>140.0 (420.0)</td>
</tr>
<tr>
<td>Minutes per week of neighborhood walking in past 7 days (^b)</td>
<td>20 (100.0)</td>
<td>27.5 (127.5)</td>
<td>60.0 (122.5)</td>
</tr>
<tr>
<td>Minutes per day of neighborhood walking in a typical day (^b)</td>
<td>0.0 (20.0)</td>
<td>0.0 (20.0)</td>
<td>15.0 (30.0)</td>
</tr>
<tr>
<td>Minutes per day of weekday sitting in past 7 days (^b)</td>
<td>390.0 (360.0)</td>
<td>345.0 (240.0)</td>
<td>180.0 (210.0)</td>
</tr>
<tr>
<td>Minutes per day of weekend day sitting in past 7 days (^b)</td>
<td>300.0 (276.0)</td>
<td>240.0 (180.0)</td>
<td>210.0 (180.0)</td>
</tr>
<tr>
<td>Obesity and Weight Loss Quality of Life (OWLQOL) score</td>
<td>63.2 (33.3)</td>
<td>59.8 (32.4)</td>
<td>65.6 (31.4)</td>
</tr>
<tr>
<td>BMI (kg/m(^2))</td>
<td>27.4 (11.4)</td>
<td>29.7 (9.7)</td>
<td>29.9 (7.7)</td>
</tr>
</tbody>
</table>

\(^a\) N’s may not sum to 969 due to missing data, %’s may not sum to 100% due to rounding
\(^b\) N’s and %’s do not take into account imputed values, as imputation and regression analyses occurred simultaneously (see Tables 2 and 3)
IQR = Interquartile Range; BMI: Body Mass Index
Table 7. SESCO Table 2. Multivariate linear regression results for associations between Godin physical activity measures (imputed values included) and Obesity and Weight Loss Quality of Life (OWLQOL) score among 969 women in the SESCO Study with data on ethnicity/acculturation, at least one measure of reported physical activity, and an OWLQOL score

<table>
<thead>
<tr>
<th></th>
<th>Godin leisure-time exercise score (continuous)</th>
<th>Godin leisure-time exercise score (ordinal categories: &lt;14 units, 14-23 units, &gt;23 units)</th>
<th>Godin frequency of engaging in sweat-inducing exercise (ordinal categories: never/rarely, sometimes, often)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Hispanic White (NHW) women (N=498)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (adjusted for a priori demographic variables) c</td>
<td>1.09 (1.01, 1.17) n=494</td>
<td>1.12 (1.05, 1.20) n=494</td>
<td>1.13 (1.04, 1.22) n=496</td>
</tr>
<tr>
<td>Model 2 (adjusted for a priori demographic variables and dietary behaviors) d</td>
<td>1.03 (0.95, 1.10) N=487</td>
<td>1.06 (0.99, 1.12) N=487</td>
<td>1.07 (0.99, 1.16) N=487</td>
</tr>
<tr>
<td>Model 3 (adjusted for a priori demographic variables and BMI) e</td>
<td>1.18 (0.81, 1.71) n=493</td>
<td>1.05 (0.99, 1.10) n=493</td>
<td>1.07 (1.01, 1.14) n=495</td>
</tr>
<tr>
<td>Model 4 (adjusted for a priori demographic variables, dietary behaviors, and BMI) f</td>
<td>0.97 (0.66, 1.42) n=486</td>
<td>1.02 (0.96, 1.07) n=486</td>
<td>1.05 (0.98, 1.12) n=486</td>
</tr>
<tr>
<td><strong>English-speaking Hispanic women (N=79)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (adjusted for a priori demographic variables) c</td>
<td>1.16 (1.01, 1.33) n=79</td>
<td>1.22 (1.07, 1.39) n=79</td>
<td>1.18 (1.01, 1.38) n=79</td>
</tr>
<tr>
<td>Model 2 (adjusted for a priori demographic variables and dietary behaviors) d</td>
<td>1.11 (0.97, 1.27) N=67</td>
<td>1.16 (1.02, 1.32) N=76</td>
<td>1.12 (0.95, 1.31) N=76</td>
</tr>
<tr>
<td>Model 3 (adjusted for a priori demographic variables and BMI) e</td>
<td>1.99 (0.84, 4.70) N=79</td>
<td>1.18 (1.04, 1.33) n=79</td>
<td>1.15 (0.99, 1.33) n=79</td>
</tr>
</tbody>
</table>
### Model 4 (adjusted for \textit{a priori} demographic variables, dietary behaviors, and BMI) \(^f\)

<table>
<thead>
<tr>
<th></th>
<th>1.65</th>
<th>1.14</th>
<th>1.08</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.72, 3.73)</td>
<td>(1.01, 1.29)</td>
<td>(0.93, 1.26)</td>
</tr>
<tr>
<td>(n)</td>
<td>76</td>
<td>76</td>
<td>76</td>
</tr>
</tbody>
</table>

### Spanish-speaking Hispanic women (N=392)

#### Model 1 (adjusted for \textit{a priori} demographic variables) \(^c\)

<table>
<thead>
<tr>
<th></th>
<th>1.06</th>
<th>1.04</th>
<th>1.10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.98, 1.14)</td>
<td>(0.97, 1.10)</td>
<td>(1.02, 1.19)</td>
</tr>
<tr>
<td>(n)</td>
<td>359</td>
<td>359</td>
<td>388</td>
</tr>
</tbody>
</table>

#### Model 2 (adjusted for \textit{a priori} demographic variables and dietary behaviors) \(^d\)

<table>
<thead>
<tr>
<th></th>
<th>0.99</th>
<th>1.00</th>
<th>1.07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.91, 1.09)</td>
<td>(0.93, 1.07)</td>
<td>(0.99, 1.16)</td>
</tr>
<tr>
<td>(N)</td>
<td>327</td>
<td>327</td>
<td>341</td>
</tr>
</tbody>
</table>

#### Model 3 (adjusted for \textit{a priori} demographic variables and BMI) \(^e\)

<table>
<thead>
<tr>
<th></th>
<th>1.34</th>
<th>1.04</th>
<th>1.10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.82, 2.18)</td>
<td>(0.98, 1.11)</td>
<td>(1.03, 1.17)</td>
</tr>
<tr>
<td>(n)</td>
<td>359</td>
<td>359</td>
<td>386</td>
</tr>
</tbody>
</table>

#### Model 4 (adjusted for \textit{a priori} demographic variables, dietary behaviors, and BMI) \(^f\)

<table>
<thead>
<tr>
<th></th>
<th>0.96</th>
<th>1.01</th>
<th>1.07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.59, 1.57)</td>
<td>(0.94, 1.07)</td>
<td>(0.99, 1.15)</td>
</tr>
<tr>
<td>(n)</td>
<td>327</td>
<td>327</td>
<td>340</td>
</tr>
</tbody>
</table>

**BMI:** Body Mass Index

\(^a\) Associations for continuous Godin score are presented as the exponentiated (back-transformed) version of the product of the slope (beta coefficient) and the interquartile range (IQR) (IQR=28)

\(^b\) Associations for categorical predictors are presented as the exponentiated (back-transformed) slope (beta coefficient).

\(^c\) Adjusted for age and education; N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.

\(^d\) Adjusted for age, education, and dietary behaviors (servings of fruits and vegetables per day, fast food meals per month, frequency of soda consumption, and frequency of eating while doing another activity); N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.

\(^e\) Adjusted for age, education, and BMI (continuous); N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.

\(^f\) Adjusted for age, education, dietary behaviors (servings of fruits and vegetables per day, fast food meals per month, frequency of soda consumption, and frequency of eating while doing another activity), and BMI (continuous); N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.
Table 8. SESO Table 3. Multivariate linear regression results for associations between walking and sitting measures (imputed values included) and Obesity and Weight Loss Quality of Life (OWLQOL) score among 969 women in the SESO Study with data on ethnicity/acculturation, at least one measure of reported physical activity, and an OWLQOL score

<table>
<thead>
<tr>
<th>Model</th>
<th>Minutes per week of total walking</th>
<th>Minutes per week of neighborhood walking</th>
<th>Minutes per day of neighborhood walking in a typical day</th>
<th>Minutes per day of weekday sitting</th>
<th>Minutes per day of weekend day sitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic White (NHW) women (N=498)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (adjusted for <em>a priori</em> demographic variables)</td>
<td>1.02 (0.98, 1.06)</td>
<td>1.02 (0.97, 1.06)</td>
<td>1.04 (0.98, 1.11)</td>
<td>0.91 (0.84, 0.98)</td>
<td>0.90 (0.85, 0.95)</td>
</tr>
<tr>
<td>Model 2 (adjusted for <em>a priori</em> demographic variables and dietary behaviors)</td>
<td>1.01 (0.97, 1.05)</td>
<td>1.00 (0.94, 1.05)</td>
<td>1.01 (0.95, 1.07)</td>
<td>0.96 (0.88, 1.04)</td>
<td>0.93 (0.88, 0.98)</td>
</tr>
<tr>
<td>Model 3 (adjusted for <em>a priori</em> demographic variables and BMI)</td>
<td>1.01 (0.98, 1.04)</td>
<td>1.01 (0.98, 1.05)</td>
<td>1.03 (0.98, 1.09)</td>
<td>0.98 (0.92, 1.05)</td>
<td>0.98 (0.93, 1.02)</td>
</tr>
<tr>
<td>Model 4 (adjusted for <em>a priori</em> demographic variables, dietary behaviors, and BMI)</td>
<td>1.00 (0.97, 1.03)</td>
<td>1.01 (0.97, 1.04)</td>
<td>1.01 (0.96, 1.07)</td>
<td>1.01 (0.94, 1.08)</td>
<td>0.99 (0.95, 1.04)</td>
</tr>
</tbody>
</table>
### English-speaking Hispanic women (N=79)

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficient</th>
<th>95% CI</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (adjusted for a priori demographic variables)(^b)</td>
<td>1.04</td>
<td>(0.95, 1.13)</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>1.08</td>
<td>(1.00, 1.17)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>1.12</td>
<td>(1.01, 1.24)</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>0.90</td>
<td>(0.73, 1.11)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>0.87</td>
<td>(0.76, 0.99)</td>
<td>78</td>
</tr>
<tr>
<td>Model 2 (adjusted for a priori demographic variables and dietary behaviors)(^c)</td>
<td>1.03</td>
<td>(0.95, 1.12)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>1.06</td>
<td>(0.98, 1.14)</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>1.07</td>
<td>(0.97, 1.19)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>0.94</td>
<td>(0.78, 1.14)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>0.93</td>
<td>(0.81, 1.05)</td>
<td>76</td>
</tr>
<tr>
<td>Model 3 (adjusted for a priori demographic variables and BMI)(^c)</td>
<td>1.02</td>
<td>(0.94, 1.11)</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>1.07</td>
<td>(1.00, 1.16)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>1.11</td>
<td>(1.00, 1.22)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>0.93</td>
<td>(0.77, 1.13)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>0.90</td>
<td>(0.80, 1.03)</td>
<td>78</td>
</tr>
<tr>
<td>Model 4 (adjusted for a priori demographic variables, dietary behaviors, and BMI)(^d)</td>
<td>1.02</td>
<td>(0.94, 1.10)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>1.05</td>
<td>(0.98, 1.13)</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>1.07</td>
<td>(0.98, 1.18)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
<td>(0.80, 1.14)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>0.97</td>
<td>(0.86, 1.09)</td>
<td>76</td>
</tr>
</tbody>
</table>

### Spanish-speaking Hispanic women (N=392)

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficient</th>
<th>95% CI</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (adjusted for a priori demographic variables)(^b)</td>
<td>1.00</td>
<td>(0.97, 1.02)</td>
<td>375</td>
</tr>
<tr>
<td></td>
<td>1.02</td>
<td>(0.98, 1.07)</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td>1.02</td>
<td>(0.96, 1.08)</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td>0.93</td>
<td>(0.86, 1.01)</td>
<td>369</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
<td>(0.89, 1.00)</td>
<td>370</td>
</tr>
<tr>
<td>Model 2 (adjusted for a priori demographic variables and dietary behaviors)(^c)</td>
<td>0.99</td>
<td>(0.96, 1.02)</td>
<td>336</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>(0.96, 1.05)</td>
<td>329</td>
</tr>
<tr>
<td></td>
<td>0.99</td>
<td>(0.93, 1.05)</td>
<td>334</td>
</tr>
<tr>
<td></td>
<td>0.96</td>
<td>(0.88, 1.04)</td>
<td>334</td>
</tr>
<tr>
<td></td>
<td>0.96</td>
<td>(0.91, 1.02)</td>
<td>335</td>
</tr>
<tr>
<td>Model 3 (adjusted for <em>a priori</em> demographic variables and BMI)</td>
<td>1.01</td>
<td>1.04</td>
<td>1.05</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>(0.99, 1.03)</td>
<td>(1.00, 1.08)</td>
<td>(1.00, 1.10)</td>
<td>(0.86, 0.99)</td>
</tr>
<tr>
<td>n=373</td>
<td>n=368</td>
<td>n=368</td>
<td>n=367</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 4 (adjusted for <em>a priori</em> demographic variables, dietary behaviors, and BMI)</th>
<th>1.00</th>
<th>1.02</th>
<th>1.00</th>
<th>0.94</th>
<th>0.95</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.98, 1.03)</td>
<td>(0.98, 1.06)</td>
<td>(0.95, 1.06)</td>
<td>(0.88, 1.01)</td>
<td>(0.90, 1.00)</td>
<td></td>
</tr>
<tr>
<td>n=335</td>
<td>n=328</td>
<td>n=329</td>
<td>n=333</td>
<td>n=334</td>
<td></td>
</tr>
</tbody>
</table>

**BMI:** Body Mass Index

*a* Associates for continuous predictors are presented as the exponentiated (back-transformed) version of the product of the slope (beta coefficient) and the interquartile range (IRQ) for each predictor: minutes per week of total walking (IQR=360), minutes per week of neighborhood walking (IQR=110), minutes per day of neighborhood walking on a typical day (IQR=25), minutes per day of weekday sitting (IQR=300), and minutes per day of weekend day sitting (IQR=180).

*b* Adjusted for age and education; N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.

*c* Adjusted for age, education, and dietary behaviors (servings of fruits and vegetables per day, fast food meals per month, frequency of soda consumption, and frequency of eating while doing another activity); N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.

*d* Adjusted for age, education, and BMI (continuous); N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.

*e* Adjusted for age, education, dietary behaviors (servings of fruits and vegetables per day, fast food meals per month, frequency of soda consumption, and frequency of eating while doing another activity), and BMI (continuous); N’s may not sum to 988 due to missing data on covariates other than physical activity (post-imputation) or OWLQOL score.
Table 9. SESO Supplementary Table 1. Missingness (N’s and %’s) in physical activity measures by ethnicity/acculturation

<table>
<thead>
<tr>
<th>Physical activity measure</th>
<th>Non-Hispanic White women N=498</th>
<th>English-speaking Hispanic women N=79</th>
<th>Spanish-speaking Hispanic women N=392</th>
</tr>
</thead>
<tbody>
<tr>
<td>Godin leisure-time exercise score (both continuous and categorical versions)</td>
<td>16 (3.2)</td>
<td>6 (7.8)</td>
<td>70 (17.9)</td>
</tr>
<tr>
<td>Godin frequency of engaging in sweat-inducing exercise (ordinal categories: Never/rarely, Sometimes, Often)</td>
<td>7 (1.4)</td>
<td>2 (2.5)</td>
<td>7 (1.8)</td>
</tr>
<tr>
<td>Minutes per week of total walking</td>
<td>17 (3.4)</td>
<td>6 (7.6)</td>
<td>55 (14.0)</td>
</tr>
<tr>
<td>Minutes per week of neighborhood walking</td>
<td>22 (4.4)</td>
<td>3 (3.8)</td>
<td>57 (14.5)</td>
</tr>
<tr>
<td>Minutes per day of neighborhood walking in a typical day</td>
<td>16 (3.2)</td>
<td>2 (2.5)</td>
<td>85 (21.7)</td>
</tr>
<tr>
<td>Minutes per day of weekday sitting</td>
<td>7 (1.4)</td>
<td>5 (6.3)</td>
<td>33 (8.4)</td>
</tr>
<tr>
<td>Minutes per day of weekend day sitting</td>
<td>5 (1.0)</td>
<td>5 (6.3)</td>
<td>31 (7.9)</td>
</tr>
</tbody>
</table>
79. Mendoza-Nunez VM, Sanchez-Rodriguez MA, Retana-Ugalde R, Vargas-Guadarrama LA, Altamirano-Lozano MA. Total antioxidant levels, gender, and age as risk


74
Appendix A: California Teachers Study (CTS)
Questionnaire
California Teachers Study

Marking Instructions

- Answer each question as best as you can — estimate if you aren’t sure.
- Use only a #2, ordinary pencil.
- Be certain to completely blacken in each of your answers, and erase completely if you make any changes.
- Do not make any other marks on this form.
- If you wish to make comments, please use a separate piece of paper.

Correct Mark
Incorrect Marks

1. Is there an error in your name or address at the left?
   
   ○ No   ○ Yes (please write the correct information)

   Name ____________________________
   Street ____________________________
   City ____________________________ State _______ Zip _______

Although men sometimes do get breast cancer, at this time the California Teachers Study focuses on women. If you are a man, please mark here and mail back the uncompleted questionnaire.

This looks like a breeze!

USC School of Medicine
1540 Alcazar Suite 215 Los Angeles CA 90033 (800) 568-9471
### Background & Environment

2. Please fill in your birthdate:

<table>
<thead>
<tr>
<th>MO</th>
<th>DAY</th>
<th>YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Were you adopted?
- No
- Yes

4. Are you a twin?
- No
- Yes
- Don't know

5. Where were you and your biological parents born? (Leave bubble blank if unknown)
- Mother
- Father
- You

- California
- Other US or Canada
- Mexico, South America, Central America or Caribbean
- Asia or Pacific Islands
- Eastern Europe or former Soviet Union
- Western Europe, Scandinavia or UK
- Middle East or Israel
- Africa
- Other

6. To what race/ethnic group do you and your biological parents belong? (Leave bubble blank if unknown)
- Black or African American
- Chinese
- Filipino
- Hawaiian
- Japanese
- Korean
- Mexican or other Hispanic/Latino
- Native American
- Vietnamese
- White or Caucasian
- Other

7. How old were your biological mother and your biological father when you were born?
- Mother
- Father
- Under age 20
- 20-24
- 25-29
- 30-34
- 35-39
- 40-44
- 45 or older
- Don't know

8. Please indicate the number of full brothers and sisters that were live-born both before and after you.

<table>
<thead>
<tr>
<th>FULL BROTHERS</th>
<th>FULL SISTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BORN BEFORE YOU</td>
<td>BORN AFTER YOU</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

9. In what capacities have you ever been employed in a California school system?

<table>
<thead>
<tr>
<th>Capacities</th>
<th>Ever (Mark all that apply)</th>
<th>Current (if currently employed mark one)</th>
<th>Longest (Mark one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preschool</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Elementary</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Mid/ Jr High</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>High School</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Pupil Services</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Administration</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

10. At how many different schools have you worked as your regular place of employment?

- 1
- 2-3
- 4-5
- Over 12

11. How many years in total have you worked with a California school system?

- Less than 1 year
- 1-4
- 5-9
- 10-14
- 15-19
- 20 years or more

12. Complete the following information about your school employment. Please mark all four columns. Mark the current year in the "End" column if still employed at that school.

<table>
<thead>
<tr>
<th>Current/Most Recent School Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School Where Employed Longest Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

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Not to be used without CTS permission
This Form is Non-Scannable
13. Have you ever lived or worked within 1/2 mile of the following?

<table>
<thead>
<tr>
<th>Location</th>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulp mill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil refinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landfill site</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. What types of overhead power lines exist within 1 block of school property:

<table>
<thead>
<tr>
<th>Location</th>
<th>Current/Most Recent School (Choose one)</th>
<th>School Where Employed Longest (Choose one)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No power lines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power lines on poles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power lines on towers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power lines on poles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AND towers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td></td>
</tr>
</tbody>
</table>

15. Complete the following information for your current place of residence and the residence where you lived the longest.

<table>
<thead>
<tr>
<th>Residence Where Lived Longest (Choose one)</th>
<th>Current Residence (Choose one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No power lines</td>
<td></td>
</tr>
<tr>
<td>Power lines on poles</td>
<td></td>
</tr>
<tr>
<td>Power lines on towers</td>
<td></td>
</tr>
<tr>
<td>Power lines on poles</td>
<td></td>
</tr>
<tr>
<td>AND towers</td>
<td></td>
</tr>
</tbody>
</table>

16. For each of the ages below that apply, please answer the following questions:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Under Age 15</th>
<th>Age 15 - 35</th>
<th>Over Age 35</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you use insect repellent on your skin or clothing?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Yes - occasionally</td>
<td>Yes - frequently</td>
<td>Yes - occasionally</td>
</tr>
<tr>
<td>Were pesticides or herbicides used in your home, lawn or garden?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Yes - occasionally</td>
<td>Yes - frequently</td>
<td>Yes - occasionally</td>
</tr>
<tr>
<td>Were you ever in a public place when insects or plants were sprayed so that you were in a cloud of spray?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Yes - occasionally</td>
<td>Yes - frequently</td>
<td>Yes - occasionally</td>
</tr>
<tr>
<td>Did you live or work on a farm or ranch where pesticides were used?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Yes - occasionally</td>
<td>Yes - frequently</td>
<td>Yes - occasionally</td>
</tr>
</tbody>
</table>

17. Indicate if you have used any of the following while sleeping at home during the past year:

<table>
<thead>
<tr>
<th>Item</th>
<th>Used during past year?</th>
<th>Number of months</th>
<th>Average number of days per week</th>
<th>Average number of hours per night</th>
<th>Average setting during a week’s use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric blanket (turned on)</td>
<td>No:</td>
<td>0-34 6/7-6/10+</td>
<td>1-34 5/6+</td>
<td>1-23-45 6/7+</td>
<td>Low/ Med/ High</td>
</tr>
<tr>
<td>Electrically heated water bed (turned on)</td>
<td>No:</td>
<td>0-34 6/7-6/10+</td>
<td>1-34 5/6+</td>
<td>1-23-45 6/7+</td>
<td>Low/ Med/ High</td>
</tr>
<tr>
<td>Room heat on at night while sleeping</td>
<td>No:</td>
<td>0-34 6/7-6/10+</td>
<td>1-34 5/6+</td>
<td>1-23-45 6/7+</td>
<td>Low/ Med/ High</td>
</tr>
<tr>
<td>Bright light on at night while sleeping</td>
<td>No:</td>
<td>0-34 6/7-6/10+</td>
<td>1-34 5/6+</td>
<td>1-23-45 6/7+</td>
<td>Low/ Med/ High</td>
</tr>
</tbody>
</table>
18. If you were in the hot sun without protection for one hour what would happen?
- Severe burn with blistering
- Severe burn without blistering
- Mild burn, then tan or darken
- No burn, but would tan or darken
- No burn or tan

19. If you were in the sun repeatedly what would eventually happen?
- Deeply tan or darken
- Moderately tan or darken
- Lightly tan or darken
- Would not tan or darken

20. Have you ever been sunburned severely enough to cause blistering?
- No (go to question 21)
- Yes

   At what age did this first occur?
   - 5 or younger
   - 6-10
   - 11-15
   - 16-20
   - 21-25
   - 26 or older

   How many times did this occur?
   - 1-2 times
   - 3-4
   - 5-9
   - 10 or more times

---

Reproductive History

21. How old were you when you had your first menstrual period?
   - Never had a period (go to question 24)
   - Under age 10
   - 10
   - 11
   - 12
   - 13

22. How long after your first menstrual period did your periods become regular (that is, when you could predict within a few days when your next period would start)?
   - Never became regular (go to question 27)
   - Less than a year
   - 1 year
   - 2 years
   - 3 years
   - 4 years
   - 5 years or more

23. Once your periods became regular, about how many days were there from the start of one period until the start of the next? Please exclude any time you were on birth control pills.
   - 24 days or less
   - 25-26
   - 27-28
   - 29-30
   - 31-32
   - 33 or more

24. Did you ever take birth control pills (oral contraceptives) for one month or longer?
   - No (go to question 27)
   - Yes, and I am currently taking them
   - Yes, but I am no longer taking them

25. How old were you when you first used birth control pills, and (if no longer taking) how old were you when you last used them?

   First Used
   - AGE:  
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

   Last Used
   - AGE:  
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7
   - 8
   - 9
   - 10

26. How many years in total have you used birth control pills (exclude those periods when you temporarily stopped)?
   - Less than 1 year
   - 1-2
   - 3-4
   - 5-9
   - 10-14
   - 15-19
   - 20-24
   - 25 years or more

27. Have you ever been pregnant?
   - No (go to question 32)
   - Yes

   This isn't too tough
28. Please indicate the outcome of each of your pregnancies next to the age when it ended (consider a multiple birth as one pregnancy).

<table>
<thead>
<tr>
<th>AGE</th>
<th>TUBAL PREGNANCY</th>
<th>ABORTION</th>
<th>MISCARRIAGE</th>
<th>STILLBIRTH</th>
<th>LIVE BIRTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 15</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>15</td>
<td>☐</td>
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<td>16</td>
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<td>30</td>
<td>☐</td>
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<tr>
<td>32</td>
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<td>☐</td>
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<td>33</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<td>☐</td>
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<tr>
<td>Over 45</td>
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</tr>
</tbody>
</table>

29. How old were you when you first breast fed a child?
- ☐ Never breast fed (go to question 31)
- Under age 18 ☐ 30-34 ☐
- 18-19 ☐ 35-39 ☐
- 20-24 ☐ 40 or older ☐
- 25-29 ☐

30. You may need scratch paper for this question. Please add together the number of months you breast fed each of your children. Enter the total months you have breast fed your children:
- ☐ Less than 6 months ☐ 36-47
- ☐ 6-11 ☐ 48-59
- ☐ 12-23 ☐ 60 or more
- ☐ 24-35 ☐

31. Have you ever taken DES (diethylstilbestrol) to prevent miscarriage?
- ☐ No
- ☐ Yes

32. Was there ever a time in your life when you tried (for at least 1 year) to become pregnant and could not?
- ☐ No
- ☐ Yes

33. Did you ever take any of the following fertility drugs to try to become pregnant? (Mark all that apply)
- ☐ Clomif (Clomiphene)
- ☐ Danazol
- ☐ Danoine
- ☐ hCG
- ☐ Miophrine
- ☐ Lupron Depot
- ☐ None

34. Have your menstrual periods stopped permanently?
- ☐ No (go to question 37)
- ☐ Yes - within the last 6 months
- ☐ Yes - more than 6 months ago

35. When did you have your last period?
- ☐ Before age 35 ☐ 47-49
- ☐ 35-39 ☐ 50-52
- ☐ 40-43 ☐ 53-55
- ☐ 44-46 ☐ 56 or older

36. Why did your periods stop?
- ☐ Natural menopause (change of life)
- ☐ Surgery (a hysterectomy to remove your uterus and/or an oophorectomy to remove your ovaries)
- ☐ Medication or chemotherapy
- ☐ Radiation
- ☐ Other

37. Have you ever had a hysterectomy (that is, surgery to remove your uterus or womb)? If so, at what age?
- ☐ Never had one ☐ 50-54
- ☐ Before age 25 ☐ 55-59
- ☐ 25-34 ☐ 60-64
- ☐ 35-44 ☐ 65 or older
- ☐ 45-49 ☐
38. Have you ever had an ovary removed?
   - No  (go to question 40)
   - Yes, but only one or part of one
   - Yes, both at the same time
   - Yes, both, but at different times
   - Yes, but don't know whether one or both
   - Don't know  (go to question 40)

39. At what age did you first have an ovary (or part of an ovary) removed?
   - Before age 25  50-54
   - 25-34  55-59
   - 35-44  60-64
   - 45-49  65 or older

40. Have you ever had your "tubes tied" (tubal ligation)? If so, at what age?
   - Never had  30-34
   - Before age 20  35-39
   - 20-24  40-44
   - 25-29  45 or older

41. Have you ever taken estrogen ("female hormones") for symptoms of menopause (the change of life) or for other reasons?
   - No  (go to question 51)
   - Yes, and I am currently taking estrogens
   - Yes, but I am no longer taking estrogens

42. The most frequently used estrogen is oral Premarin. Have you ever taken Premarin by mouth (as pills)?
   - No  (go to question 47)
   - Yes

43. At what age did you first take Premarin?
   - Before age 45  60-64
   - 45-49  65-69
   - 50-54  70 or older
   - 55-59

44. At what age did you last take Premarin?
   - Currently taking  55-59
   - Before age 45  60-64
   - 45-49  65-69
   - 50-54  70 or older

45. How many years in total did you take Premarin (exclude those periods when you temporarily stopped)?

YEARS:

<table>
<thead>
<tr>
<th>Years</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
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<td>48</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>

46. Five commonly used doses of Premarin can be distinguished by the color of the pill. Please indicate any you have ever used, and the one you used for the longest period.

<table>
<thead>
<tr>
<th>Ever Used</th>
<th>Longest Used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Mark one)</td>
</tr>
<tr>
<td>Green (3.3 mg)</td>
<td>No  Yes</td>
</tr>
<tr>
<td>Brown/Red (0.625 mg)</td>
<td>No  Yes</td>
</tr>
<tr>
<td>White (0.9 mg)</td>
<td>No  Yes</td>
</tr>
<tr>
<td>Yellow/Orange (1.25 mg)</td>
<td>No  Yes</td>
</tr>
<tr>
<td>Purple (2.5 mg)</td>
<td>No  Yes</td>
</tr>
</tbody>
</table>

47. Have you ever used estrogen other than Premarin pills? (Answer for each)

<table>
<thead>
<tr>
<th>Method of Administration</th>
<th>Ever Used</th>
<th>Longest Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen by mouth</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Estrogen by injection</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Estrogen by patch or implant</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Estrogen vaginal cream or suppository</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

If you answered no to all parts of question 47, go to question 51.

48. At what age did you first use estrogens other than Premarin pills?
   - Before age 45  60-64
   - 45-49  65-69
   - 50-54  70 or older
   - 55-59

49. At what age did you last use estrogens other than Premarin pills?
   - Currently taking  55-59
   - Before age 45  60-64
   - 45-49  65-69
   - 50-54  70 or older
50. How many years in total did you take estrogens other than Premarin pills (exclude any time when you temporarily stopped)?
   - Less than 1 year
   - 1-2
   - 3-5
   - 6-9
   - 10-14
   - 15-19
   - 20 years or more

51. Sometimes another type of female hormone, progesterone (or "progestin"), is given for symptoms of menopause, either alone or in combination with estrogen. The most frequently used progestin is Provera (medroxyprogesterone acetate). Have you ever used progesterone or a progestin?
   - No (go to question 57)
   - Provera only
   - Another type only
   - Provera and another type of progestin
   - Yes, but don't know type

52. At what age did you first take progesterone or a progestin?
   - Before age 40
   - 40-44
   - 45-49
   - 50-54
   - 55-59
   - 60-64
   - 65-69
   - 70 years or older

53. At what age did you last take progesterone or a progestin?
   - Currently taking
   - Before age 45
   - 45-49
   - 50-54
   - 55-59
   - 60-64
   - 65-69
   - 70 years or older

54. How many years in total did you take progesterone or a progestin (exclude any time when you temporarily stopped)?
   - Less than 1 year
   - 1-2
   - 3-5
   - 6-9
   - 10-14
   - 15-19
   - 20 years or more

55. If you used Provera, what was your usual dose?
   - Did not use Provera
   - 2.5 mg per day
   - 5.0 mg per day
   - 10 mg per day
   - 20 mg per day
   - Another dose
   - Don't know

56. When using a progestin or progesterone, for how many days each month would you usually take it?

57. Have you ever had breast cancer?
   - No (go to question 59)
   - Yes

58. At what age were you first diagnosed with breast cancer?

59. Have you ever had breast implants?
   - No (go to question 62)
   - Yes - after breast cancer
   - Yes - for other reasons

60. At what age did you first have breast implants?
   - Before age 25
   - 25-29
   - 30-34
   - 35-39
   - 40-44
   - 45-49
   - 50-54
   - 55-59
   - 60-64
   - 65 or older
61. Which kind of breast implants have you had?
  - Silicone gel
  - Saline
  - Both
  - Don't know

62. Have you ever had any of the following exams? If yes, please mark how long it has been since you last had the test.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Ever had?</th>
<th>Number of years since last exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammogram</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast exam by health provider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAP smear</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

63. In the last year how often have you examined your breasts for unusual signs or lumps (a breast self exam)?
  - Rarely or never
  - Once a month
  - 2 or 3 times a month
  - More than once a month

64. Have you ever had a blood transfusion?
  - No
  - Before age 35
  - 35-44
  - After age 45

65. What are your height and weight today, and what were they when you were age 18?

<table>
<thead>
<tr>
<th>Height (ft in)</th>
<th>Weight (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today</td>
<td>Age 18</td>
</tr>
</tbody>
</table>

66. Have you taken any of the following medications regularly (at least once a week)? If so, indicate how many total years you took it and how often you took it.

<table>
<thead>
<tr>
<th>Medication</th>
<th>How many total years</th>
<th>How often on average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibuprofen</td>
<td></td>
<td></td>
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<tr>
<td>Tagamet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserpine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Pills for High Blood Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Supplements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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67. Have you or any relatives had any of the following cancers or other medical conditions? Do not include adoptive, half, or step relatives.

Please note the following:
- If a relative has had or had more than one of the listed conditions, please fill in all that apply on the same line for that relative.
- For combined relatives please fill in all conditions that apply for any of them on the same line.

**Examples:** If you have not had any other medical conditions, your mother had both high blood pressure and diabetes, and your father had high blood pressure, you would mark your answers as shown:

<table>
<thead>
<tr>
<th>Cancers</th>
<th>Other Medical Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast Cancer (AFTER age 50 OR don't know age)</td>
<td>High Blood Pressure</td>
</tr>
<tr>
<td>Breast Cancer (BEFORE age 50)</td>
<td>Heart Attack/Myocardial Infarction</td>
</tr>
<tr>
<td>Endometrial Cancer (Body of Uterus/Womb)</td>
<td>Stroke</td>
</tr>
<tr>
<td>Cervix Cancer</td>
<td>Many Large Moles or Moles Removed</td>
</tr>
<tr>
<td>Ovary Cancer</td>
<td>Thyroid Disease (not Cancer)</td>
</tr>
<tr>
<td>Lung Cancer</td>
<td>Colon or Rectum Polyps (not Cancer)</td>
</tr>
<tr>
<td>Leukemia</td>
<td>Breast Biopsy (not Cancer)</td>
</tr>
<tr>
<td>Hodgkin's Disease or Lymphoma</td>
<td>Migraine Headaches</td>
</tr>
<tr>
<td>Colon/Rectum Cancer</td>
<td>Endometriosis</td>
</tr>
<tr>
<td>Prostate Cancer</td>
<td>Fibroids in the Womb</td>
</tr>
<tr>
<td>Thyroid Cancer</td>
<td>Other Skin Cancer</td>
</tr>
<tr>
<td>Malignant Melanoma</td>
<td>Gail Stones</td>
</tr>
<tr>
<td>Other Skin Cancer</td>
<td>Never Had Any of Above</td>
</tr>
<tr>
<td>Never Had Any of Above</td>
<td>Never Had Any of Above</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Myself</th>
<th>Mother</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father</td>
<td></td>
</tr>
</tbody>
</table>

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### Physical Activity

Following are questions about your physical activity at various times in your life. For each of the ages below that apply, please estimate the average amount of time each week and the average number of months each year that you spent in these activities.

#### 68. STRENUOUS EXERCISE

How often did you participate in STRENUOUS exercise activities or sports (e.g., swimming laps, aerobics, calisthenics, running, jogging, basketball, cycling on hills, racquetball)?

<table>
<thead>
<tr>
<th>Average hours per week:</th>
<th>Average months per year:</th>
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<tr>
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<tr>
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<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>1/2 hr</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>1 hr</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>1 1/2 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>2 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>3 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>4-6 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
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<tr>
<td>7-10 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>11 or more hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
</tbody>
</table>

- During High School
- Between Ages 18 and 24
- Between Ages 25 and 34
- Between Ages 35 and 44
- Between Ages 45 and 54
- Past 3 years

#### 69. MODERATE EXERCISE

How often did you participate in MODERATE exercise activities or sports (e.g., brisk walking, golf, volleyball, cycling on level streets, recreational tennis, or softball)?

<table>
<thead>
<tr>
<th>Average hours per week:</th>
<th>Average months per year:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>1/2 hr</td>
<td>1 2 3 4-6 7-9 10-12</td>
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<tr>
<td>1 hr</td>
<td>1 2 3 4-6 7-9 10-12</td>
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<tr>
<td>1 1/2 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
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<tr>
<td>2 hrs</td>
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<tr>
<td>3 hrs</td>
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<tr>
<td>7-10 hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
<tr>
<td>11 or more hrs</td>
<td>1 2 3 4-6 7-9 10-12</td>
</tr>
</tbody>
</table>

- During High School
- Between Ages 18 and 24
- Between Ages 25 and 34
- Between Ages 35 and 44
- Between Ages 45 and 54
- Past 3 years

#### 70. OTHER ACTIVITIES

In the past year, on average, how many hours per day did you spend in each of the following activities?

<table>
<thead>
<tr>
<th>Average hours per day:</th>
<th>Days per week:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4-6 6-7</td>
</tr>
</tbody>
</table>

- Casual walking
- Doing housework
- Standing or walking at work
- Sitting
- Sleeping

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71. During the past year have you taken any vitamins or minerals regularly (at least once a week)?
   ○ No (go to 73)
   IF YES, WHAT DO YOU TAKE REGULARLY?

<table>
<thead>
<tr>
<th>VITAMIN TYPE</th>
<th>HOW OFTEN</th>
<th>FOR HOW MANY YEARS?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3 DAYS</td>
<td>DONT TAKE PER WEEK</td>
</tr>
<tr>
<td></td>
<td>4-6 DAYS</td>
<td>PER WEEK</td>
</tr>
<tr>
<td></td>
<td>EVERY DAY</td>
<td>PER DAY</td>
</tr>
<tr>
<td>Multiple Vitamins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular One-A-Day, Centrum, or Thera type</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Single Vitamins (not part of multiple vitamins)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Vitamin A (not beta-carotene)</td>
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<td>○</td>
</tr>
<tr>
<td>Beta-carotene</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Selenium</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

72. If you take any of the following vitamins (alone or as part of a multiple vitamin), you might want to go and get the bottle(s). Please indicate how much of each vitamin you take, on the days you take it: (choose the closest measure)
   Vitamin A OR Beta-carotene
   (Part of multiple vitamin only) (IU)
   ○ 5000  ○ 6000  ○ 10000  ○ 20000+  ○ 30000+  ○ 50000+
   Vitamin A (Separate Pills only) (IU)
   ○ 6000  ○ 10000  ○ 25000  ○ 50000+  ○ 100000+  ○ 200000+
   Beta-carotene (Separate Pills only) (IU)
   ○ 6000  ○ 10000  ○ 25000  ○ 50000+  ○ 100000+  ○ 200000+
   Vitamin C (Alone or multiple vitamin) (mg)
   ○ 100  ○ 250  ○ 500  ○ 750  ○ 1000  ○ 1500  ○ 2000  ○ 3000+  ○ 5000+
   Vitamin E (mg)
   ○ 50  ○ 100  ○ 200  ○ 400  ○ 600  ○ 1000  ○ 2000  ○ 3000+  ○ 5000+
   Selenium (mcg)
   ○ 10  ○ 15  ○ 20  ○ 30  ○ 40  ○ 100  ○ 200  ○ 300+  ○ 500+  ○ 1000+

If you take multiple vitamin(s), please print the brand name(s) here:

The next section is about your usual eating habits over the past year. We know that this section is long and can become tedious but it is very important for our understanding of breast cancer risk and may help in finding ways to prevent this disease.

73. FIRST: Mark the column to show HOW OFTEN, on the average, you ate the food during the past year.
   SECOND: Mark the column to show HOW MUCH you usually eat of each food.
   - Sometimes the "how much" is asked as number of pieces, such as 1 egg, 2 eggs or 3 eggs.
   - Mark your serving size as the number you usually eat ON THE DAYS YOU EAT IT.
   - Sometimes the "how much" is asked as small-medium-large (S-M-L).
   A "medium" serving is indicated for each food, but only as a guideline. Mark "small" if you think you usually eat a smaller portion of that food than other women of your age. Mark "large" if you eat more of it than other women of your age.

EXAMPLE: This person eats one medium size banana per week.

<table>
<thead>
<tr>
<th>TYPE OF FOOD</th>
<th>HOW OFTEN</th>
<th>HOW MUCH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NEVER OR LESS THAN ONCE PER MONTH</td>
<td>1 PER MONTH</td>
</tr>
<tr>
<td></td>
<td>MEDIUM SERVING</td>
<td>YOUR SERVING SIZE S</td>
</tr>
</tbody>
</table>

EXAMPLE: Bananas
FRUIT
Bananas
Apples, applesauce
Oranges (not including juice)
Grapefruit (not including juice)
Cantaloupe
Peaches, apricots (fresh, in season)
<table>
<thead>
<tr>
<th>TYPE OF FOOD</th>
<th>NEVER OR LESS THAN ONCE PER MONTH</th>
<th>1 PER MON</th>
<th>2-3 PER WEEK</th>
<th>1 PER WEEK</th>
<th>2-4 PER WEEK</th>
<th>3-5 PER WEEK</th>
<th>EVERY DAY</th>
<th>MEDIUM SERVING</th>
<th>YOUR SERVING SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peaches, apricots (canned or dried)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>1 medium bowl</td>
<td>S (bowl) M (cup) L (oz)</td>
</tr>
<tr>
<td>Prunes, or prune juice</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>1/2 cup</td>
<td>S (cup) M (cup) L (oz)</td>
</tr>
<tr>
<td>Watermelon (in season)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>1 slice</td>
<td>S (slice) M (slice) L (slice)</td>
</tr>
<tr>
<td>Strawberries, other berries (in season)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>1/2 cup</td>
<td>S (cup) M (cup) L (oz)</td>
</tr>
<tr>
<td>Any other fruit, including kiwi, fruit cocktail, grapes, raisins, mangoes</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>1/2 cup</td>
<td>S (cup) M (cup) L (oz)</td>
</tr>
</tbody>
</table>

**EGGS, DAIRY, CEREALS**

<table>
<thead>
<tr>
<th>Type of Food</th>
<th>How Often</th>
<th>How Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber cereals like raisin bran, granola or Shredded Wheat</td>
<td>○</td>
<td>1 medium bowl</td>
</tr>
<tr>
<td>Sweetened cereals like Frosted Flakes</td>
<td>○</td>
<td>1 med. bowl</td>
</tr>
<tr>
<td>Other cold cereals like corn flakes or Cheerios</td>
<td>○</td>
<td>1 med. bowl</td>
</tr>
<tr>
<td>Cooked cereal like oatmeal, oat bran or grits</td>
<td>○</td>
<td>1 med. bowl</td>
</tr>
<tr>
<td>Milk on cereal</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Breakfast bars, granola bars, power bars</td>
<td>○</td>
<td>1 serving</td>
</tr>
<tr>
<td>Breakfast shakes, diet shakes</td>
<td>○</td>
<td>1 serving</td>
</tr>
<tr>
<td>Pancakes or waffles</td>
<td>○</td>
<td>2 med. (piece)</td>
</tr>
<tr>
<td>Eggs</td>
<td>○</td>
<td>1 egg or 2 egg-white</td>
</tr>
<tr>
<td>Egg substitutes, Egg Beaters, egg whites</td>
<td>○</td>
<td>2 eggs (piece)</td>
</tr>
<tr>
<td>Sausage or bacon</td>
<td>○</td>
<td>2 patties (piece)</td>
</tr>
<tr>
<td>Cottage cheese</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Other cheeses and cheese spreads (regular or lowfat)</td>
<td>○</td>
<td>2 slices (8 oz)</td>
</tr>
<tr>
<td>Yogurt, frozen yogurt (regular or lowfat)</td>
<td>○</td>
<td>8 oz container</td>
</tr>
</tbody>
</table>

**VEGETABLES (fresh, frozen or canned, or in restaurants)**

<table>
<thead>
<tr>
<th>Type of Food</th>
<th>How Often</th>
<th>How Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>String beans, green beans</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Peas</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Chili with beans (with or without meat)</td>
<td>○</td>
<td>1 cup</td>
</tr>
<tr>
<td>Other beans such as baked beans, pinto, kidney (not including soup)</td>
<td>○</td>
<td>3/4 cup</td>
</tr>
<tr>
<td>Corn</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Alfalfa sprouts, including on sandwiches</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Tomatoes, tomato juice</td>
<td>○</td>
<td>1 medium or 8 oz glass</td>
</tr>
<tr>
<td>Salsa, ketchup, taco sauce</td>
<td>○</td>
<td>2 tablespoon</td>
</tr>
<tr>
<td>Broccoli</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Cauliflower or brussels sprouts</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Spinach (cooked or raw)</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Mustard greens, turnip greens, collards</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Cole slaw, cabbage</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Carrots, or mixed vegetables containing carrots</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Green salad</td>
<td>○</td>
<td>1 med. bowl</td>
</tr>
<tr>
<td>Salad dressing &amp; mayonnaise (regular or lowfat)</td>
<td>○</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>TYPE OF FOOD</td>
<td>NEVER OR LESS THAN ONCE PER MONTH</td>
<td>1 PER MON</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>French fries and fried potatoes</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Sweet potatoes, yams</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other potatoes, including boiled, baked, mashed &amp; potato salad</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Any other vegetable, such as cooked onions, summer squash</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Butter, margarine or other fat added to veg., potatoes, etc.</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Tofu, bean curd</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Meat substitutes made from soy</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td><strong>MEATS, SOUPS, PASTA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamburgers, cheeseburgers</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Burritos or tacos with meat or beans</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Beef roasts, steaks, sandwiches</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Beef stew or pot pie with carrots or other vegetables</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Liver, including chicken livers</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Pork, including chops, roasts</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Fried chicken</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Chicken or turkey (roasted or broiled, including on sandwiches)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Chicken stew or mixed dish with chicken</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Fried fish or fish sandwich</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Tuna, tuna salad, tuna casserole</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Oysters</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Shell fish, (shrimp, crab, lobster, etc.)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other fish (broiled or baked)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Spaghetti, lasagna, other pasta with tomato sauce</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Cheese dishes without tomato sauce, like macaroni and cheese</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Pasta salad, other pasta without tomato sauce</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Pizza</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Hot dogs</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Ham, bologna, other lunch meats (regular or made with turkey)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Vegetable soups with carrots or tomatoes, such as vegetable beef or tomato soup</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Lentil, pea and bean soups</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other soups, like chicken noodle, mushroom, Cup-A-Soup, ramen</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>TYPE OF FOOD</td>
<td>NEVER OR LESS THAN ONCE PER MONTH</td>
<td>1 PER MON</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>----------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BREADS, SNACKS, SPREADS (Please note that the categories for these columns are different.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biscuits, muffins, (including fast foods)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Bagels, English muffins, hamburger buns</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>White bread, French or Italian bread, including sandwiches</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Dark bread, such as whole wheat, rye, pumpernickel</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Cornbread, corn muffins</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Tortillas</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Snacks like nachos with cheese, potato skins with topping</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Salty snacks, like potato chips, corn chips, popcorn, crackers</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Peanuts, peanut butter</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Margarine on bread or rolls</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Butter on bread or rolls</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Rice, or dishes made with rice</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>SWEETS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ice cream (regular or lowfat)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Doughnuts, pastry</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Cookies or cake (regular or lowfat)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Pumpkin pie, sweet potato pie</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other pies</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Chocolate candy, candy bars</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other candy or jelly</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>BEVERAGES (Please note that the categories for these columns are different.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange juice or grapefruit juice</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Apple juice, grape juice</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Whole milk (or chocolate whole milk), not including on cereal</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>2% milk (or chocolate 2% milk), not including on cereal</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Skim milk, 1% milk, not including on cereal</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Kool-Aid, Hi-C, or other drinks with added vitamin C</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Snapple, Calistoga, sweetened bottled waters or iced teas</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Regular soft drinks (not diet soda)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Coffee or tea</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Non-dairy creamer in coffee or tea</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Cream (real) or Half-and-Half in coffee or tea</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
91
83. Please indicate how much and how often you usually drank each beverage.

<table>
<thead>
<tr>
<th>Drink is:</th>
<th>Drinks per week (Choose 1 for each row)</th>
<th>How many days of the week did you have at least 1 drink?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 bottle, can, or glass of beer</td>
<td>N</td>
<td>O</td>
</tr>
<tr>
<td>1 glass of wine, champagne, or wine cooler</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>1 cocktail, shot, or mixed drink of liquor</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Age 18-22</td>
<td>Beer</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Wine, Champagne</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Cocktails, liquor</td>
<td>O</td>
</tr>
<tr>
<td>Age 30-35</td>
<td>Beer</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Wine, Champagne</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Cocktails, liquor</td>
<td>O</td>
</tr>
<tr>
<td>Past Year</td>
<td>Beer</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Wine, Champagne</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>Cocktails, liquor</td>
<td>O</td>
</tr>
</tbody>
</table>

84. Have you smoked at least 100 cigarettes in your entire life?
- No (go to question 87)
- Yes, and I currently smoke
- Yes, and I no longer smoke

85. How old were you when you first smoked fairly regularly, and if no longer smoking, how old were you when you last smoked?
- Never smoked regularly

AGE:

First Smoked

Last Smoked

86. On average, about how many cigarettes a day do you/did you smoke?
- Less than 1 cigarette
- 1-4
- 5-9
- 10-14
- 15-19
- 20-29
- 30-39
- 40 or more

87. Did your parents smoke in the house when you lived with them?
- Father only
- Mother only
- Both parents
- Neither parent

88. As an adult have the persons with whom you have lived smoked?
- Never
- Rarely
- Some of time
- Yes, usually
- Have lived alone

89. Please give us your telephone number to call if we have a question.

HOME TELEPHONE NUMBER

MO | DAY | YEAR


Social Security Number

I made it!
Appendix B: Vitamins And Lifestyle (VITAL) Study Questionnaire
INSTRUCTIONS
This questionnaire is only for the person named in the letter. If you received the questionnaire for the wrong sex, call us at 1-888-328-1124.
• Please use pencil.
• Answer by filling in the correct oval.
  Yes  No
• Answer each question as best as you can. You may put comments on the back page.
• You may skip any question that you do not want to answer.
• Some questions have a follow-up question. Follow the arrows.
  Yes  If yes, answer this question too  No

DAILY ACTIVITIES
1. How many flights of stairs do you climb up each day at home, work or elsewhere?
   0-1  5-9
   2-4  10 or more
2. Are you able to walk a half mile (5-8 city blocks) without stopping?
   Yes, at a moderate or fast pace
   Yes, slowly
   No, not able
   No, doctor doesn't allow
   No, not able due to temporary condition (such as recent surgery)
3. Are you currently employed (including self-employed)?
   Yes  No
   On average, how many hours do you work each week?
   1-29 hours  45-54
   30-44  55+ hours
4. Have you ever smoked cigarettes regularly (at least 1 cigarette a day) for at least a year?
   No  Go to Question 5, next page
   Yes
   a) How old were you when you first started smoking cigarettes daily?
      14 or younger  18-21
      15-17  30 or older
   b) During the years you smoked, how many cigarettes did you usually smoke each day?
      1-4  35-44
      5-14  45-54
      15-24  55+
   c) How many years have you been (or were you) a regular smoker? Do not count times you stayed off cigarettes.
      1-4 years  20-29
      5-9  30-39
      10-19  40 years or more
   d) Do you smoke cigarettes now?
      Yes  No
5. How many hours do you usually sleep each day (each 24 hours)?
- 5 or less
- 6
- 7
- 8
- 9
- 10 or more

6. Have you had any of these sleep problems at least half the days of the past year? Mark all that apply.
- Trouble falling asleep when you first go to bed
- Waking up during the night and not easily going back to sleep
- Waking up in the morning earlier than planned or desired
- Feeling unsatisfied or not rested by your night’s sleep
- Feeling excessively sleepy during the day (does not include regular naps)

7. In the past 10 years were there times when you woke up at night and could not fall back to sleep for an hour or more?
- Yes
- No

8. Have you ever worked the graveyard shift (late night to morning) at least 10 nights per month?
- Yes
- No

   a) How many years did you work the graveyard shift?
   - Less than 1 year
   - 1-4 years
   - 5-9 years
   - 10-19 years
   - 20 years or more

9. On a scale of 1 to 6, how would you rate your ability to handle stress?
- Stress eats away at me
- I can shake off stress

   1 2 3 4 5 6

10. In the past year, how would you rate the amount of stress in your life (at home and work)?
- No stress
- Extreme stress

   1 2 3 4 5 6

11. In general, how often do you laugh?
- Less than once a day
- 1-2 times per day
- 3-5 times per day
- 6-9 times per day
- 10 or more times per day

12. How would you rate your health?
- Excellent
- Very good
- Good
- Fair
- Poor

13. How would you compare your memory now to when you were 25?
- Better
- About the same
- Somewhat worse
- Much worse

14. Do you have a hearing aid?
- Yes
- No
15. In the past month, did you WALK for exercise? Include walking on a treadmill.
   - Yes, at least once a week
   - No
      a) Days per week?
         - 1-2
         - 3-4
         - 5-7
      b) Minutes per day?
         - 10-25
         - 30-40
         - 45-55
         - 60+
      c) Usual pace?
         - Casual (each mile takes 30 minutes or more)
         - Moderate (each mile takes 20-29 minutes)
         - Fast (each mile takes 19 minutes or less)

16. In the past month, did you LIFT WEIGHTS or use weight machines?
   - Yes, at least once a week
   - No
      a) Days per week?
         - 1-2
         - 3-4
         - 5-7
      b) Minutes per day?
         - 10-25
         - 30-40
         - 45-55
         - 60+
      c) What types of exercise did you do most often? Mark one or two.
         - If you used an exercise machine, choose the closest activity.
         - Light conditioning exercises
         - Low impact or water aerobics
         - Aerobics class or video
         - Running/jogging
         - Swimming laps
         - Popular or folk dancing
         - Slow cycling or stair machine
         - Fast cycling or stair machine
         - Tennis, racquetball, squash
         - Other

17. In the past month, did you do YOGA?
   - Yes, at least once a week
   - No
      a) Days per week?
         - 1-2
         - 3-4
         - 5-7
      b) Minutes per day?
         - 10-25
         - 30-40
         - 45-55
         - 60+

18. In the past month, did you do MILD exercise such as golf, slow dancing or bowling?
   - Yes, at least once a week
   - No
      a) Days per week?
         - 1
         - 2
         - 3-4
         - 5-7
      b) Hours per day?
         - Less than 1 hour
         - 1 hour
         - 3+ hours

19. In the past month, did you do MODERATE OR STRENUIOUS exercise such as running, aerobics, folk dancing, swimming, cycling or sports?
   - Yes, at least once a week
   - No
      a) Days per week?
         - 1-2
         - 3-4
         - 5-7
      b) Minutes per day?
         - 10-25
         - 30-40
         - 45-55
         - 60+

20. At each of the following ages, how many days per week did you usually exercise or play sports for at least 20 minutes?

<table>
<thead>
<tr>
<th>Number of days per week?</th>
<th>None</th>
<th>1</th>
<th>2-3</th>
<th>4-5</th>
<th>6-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
21. In the past 10 years, have you taken a MULTIVITAMIN at least once a week for a year?
   ○ No  Go to Question 27, Page 6
   ○ Less than once a week
   ○ Yes, at least once a week for a year

   a) Years taken in past 10 years?
      ○ 1-3
      ○ 4-6
      ○ 7-9
      ○ 10+

   b) Days per week?
      ○ 1-2
      ○ 3-4
      ○ 5-6
      ○ 7

22. Do you take a MULTIVITAMIN now?
   ○ No  Go to Question 26, Page 6
   ○ Yes

23. What brand of MULTIVITAMIN do you take now? Mark only one.
   ○ Centrum®
   ○ Centrum Silver®
   ○ Central Vite
   ○ Central Vite for Mature Adults
   ○ RiteAid® Whole Source Mature Adult
   ○ Kirkland® Multivitamin with minerals
   ○ Kirkland® Mature Adult
   ○ Kirkland® Premium with herbas
   ○ NatureMade® Multivitamin with minerals
   ○ NatureMade® 50+ Multivitamin with minerals
   ○ One-A-Day® Maximum with minerals
   ○ One-A-Day® Essential (no minerals)
   ○ One-A-Day® Women's
   ○ One-A-Day® 50 Plus
   ○ Theragran-M® with minerals
   ○ Theragran® (no minerals)

How long have you taken this brand of MULTIVITAMIN?
   ○ 1-3 years
   ○ 4-6 years
   ○ 7-9 years
   ○ 10+ years

   Go to Question 25, Page 6

My brand is not listed above  Go to Question 24, next page
If your MULTIVITAMIN was not on the list in Question 23, please answer the following questions.

24. What is in the MULTIVITAMIN you take now? Please look at the label and tell us the amount in a single day’s dose. The most common amounts are listed. If your multivitamin contains a different amount, choose the closest.

<table>
<thead>
<tr>
<th>Closest amount per day</th>
<th>Closest amount per day</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Vitamin A</strong></td>
<td><strong>Calcium</strong></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 100 mg</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 250 mg</td>
</tr>
<tr>
<td></td>
<td>○ 500 mg</td>
</tr>
<tr>
<td></td>
<td>○ 800 mg</td>
</tr>
<tr>
<td></td>
<td>○ 1000 mg</td>
</tr>
<tr>
<td><strong>Vitamin C</strong></td>
<td><strong>Iron</strong></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 10 mg</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 18 mg</td>
</tr>
<tr>
<td></td>
<td>○ 27 mg</td>
</tr>
<tr>
<td></td>
<td>○ 50 mg</td>
</tr>
<tr>
<td><strong>Thiamin (B1)</strong></td>
<td><strong>Zinc</strong></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 1.5 mg</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 15 mg</td>
</tr>
<tr>
<td></td>
<td>○ 30 mg</td>
</tr>
<tr>
<td></td>
<td>○ 60 mg</td>
</tr>
<tr>
<td><strong>Vitamin B6</strong></td>
<td><strong>Selenium</strong></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 2 mg</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 25 mcg</td>
</tr>
<tr>
<td></td>
<td>○ 50 mcg</td>
</tr>
<tr>
<td></td>
<td>○ 100 mg</td>
</tr>
<tr>
<td><strong>Folic acid (folate)</strong></td>
<td></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 400 mcg</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 600 mcg</td>
</tr>
<tr>
<td></td>
<td>○ 800 mcg</td>
</tr>
<tr>
<td><strong>Vitamin B12</strong></td>
<td></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 6 mcg</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 8 mcg</td>
</tr>
<tr>
<td></td>
<td>○ 10 mcg</td>
</tr>
<tr>
<td></td>
<td>○ 12 mcg</td>
</tr>
<tr>
<td><strong>Vitamin E</strong></td>
<td></td>
</tr>
<tr>
<td>○ Yes</td>
<td>○ 30 IU</td>
</tr>
<tr>
<td>○ No</td>
<td>○ 50 IU</td>
</tr>
<tr>
<td></td>
<td>○ 100 IU</td>
</tr>
<tr>
<td></td>
<td>○ 200 IU</td>
</tr>
<tr>
<td></td>
<td>○ 400 IU</td>
</tr>
<tr>
<td></td>
<td>○ 600 IU</td>
</tr>
</tbody>
</table>

Does your MULTIVITAMIN contain any of these other vitamins and minerals? Mark all that apply.
- Riboflavin (B2)
- Magnesium
- Niacin (B3)
- Chromium
- Vitamin D
- Vitamin B6
- Folic acid
- Thiamin
- Zinc
- Selenium
- Copper
- Iodine
- Manganese
- Molybdenum
- Nickel
- Silicon
- Vanadium

Does your MULTIVITAMIN contain any of these other compounds? Mark all that apply.
- Beta-carotene
- Pantothenic acid
- Caffeine
- Green tea
- Yeast
- Probiotics
- Greens

How long have you taken this brand of MULTIVITAMIN?
- 1-3 years
- 4-6 years
- 7-9 years
- 10+ years
25. In the past 10 years, did you take a different brand of MULTIVITAMIN than you take now?
   - No  Go to Question 27
   - Yes

26. In the past 10 years, what brand of MULTIVITAMIN did you take most often? *Mark only one.*
   - Centrum®
   - Centrum Silver®
   - NatureMade® Multivitamin with minerals
   - NatureMade® 50+ Multivitamin with minerals
   - One-A-Day® Multivitamin with minerals
   - One-A-Day® Multivitamin (no minerals)
   - Theragran-M® with minerals
   - Theragran® (no minerals)
   - Unicapl® M tablets with minerals
   - Unicapl® Plus Iron Multivitamin
   - Unicapl® Senior tablets
   - Generic or store brand
   - Other brands
   - Don't know

**VITAMINS, MINERALS AND OTHER SUPPLEMENTS (not including multivitamins)**

27. In the past 10 years, have you taken any dietary supplements other than a multivitamin for at least a year? Include vitamins, minerals, herbs, and mixtures. Also include calcium, Tums® and other antacid tablets that contain calcium.
   - No  Go to Question 29, Page 10
   - Less than once a week
   - Yes, at least once a week for a year

28. In the past 10 years, which vitamins, minerals, and herbs are (or were) in your supplements? Do NOT include multivitamins. If you have the bottles, please look at the labels. The most common amounts are listed. If your supplement contains a different amount, choose the closest.

<table>
<thead>
<tr>
<th>Vitamin A</th>
<th>Years taken in past 10 years?</th>
<th>Days per week?</th>
<th>Closest amount per day?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3</td>
<td>1-2</td>
<td>5000 IU</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>7500 IU</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>10,000 IU</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>15,000 IU</td>
</tr>
<tr>
<td></td>
<td>Only took in the past</td>
<td></td>
<td>20,000 IU</td>
</tr>
<tr>
<td></td>
<td>Don't know</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beta-carotene</th>
<th>Years taken?</th>
<th>Days per week?</th>
<th>Closest amount per day?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3</td>
<td>1-2</td>
<td>5000 IU</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>7500 IU</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>10,000 IU</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>15,000 IU</td>
</tr>
<tr>
<td></td>
<td>Only took in the past</td>
<td></td>
<td>20,000 IU</td>
</tr>
<tr>
<td></td>
<td>Don't know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin</td>
<td>Years taken in past 10 years?</td>
<td>Days per week?</td>
<td>Closest amount per day?</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------</td>
<td>----------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>1-3</td>
<td>1-2</td>
<td>60 mg</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>100 mg</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>250 mg</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>500 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1500 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Don’t know</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>1-3</td>
<td>1-2</td>
<td>400 IU</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>600 IU</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>800 IU</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>Don’t know</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>1-3</td>
<td>1-2</td>
<td>30 IU</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>100 IU</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>200 IU</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>400 IU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600 IU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>800 IU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Don’t know</td>
</tr>
<tr>
<td>Thiamin (B1)</td>
<td>1-3</td>
<td>1-2</td>
<td>1.5 mg</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>50 mg</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>100 mg</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>Don’t know</td>
</tr>
<tr>
<td>Niacin (B3) or nicotinic acid</td>
<td>1-3</td>
<td>1-2</td>
<td>20 mg</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>50 mg</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>100 mg</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>250 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Don’t know</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>1-3</td>
<td>1-2</td>
<td>2 mg</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>50 mg</td>
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<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>100 mg</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>250 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Don’t know</td>
</tr>
<tr>
<td>Folic acid (folate)</td>
<td>1-3</td>
<td>1-2</td>
<td>400 mcg</td>
</tr>
<tr>
<td></td>
<td>4-6</td>
<td>3-4</td>
<td>600 mcg</td>
</tr>
<tr>
<td></td>
<td>7-9</td>
<td>5-6</td>
<td>800 mcg</td>
</tr>
<tr>
<td></td>
<td>10+</td>
<td>7</td>
<td>Don’t know</td>
</tr>
</tbody>
</table>
### Vitamin B12
- Yes, take now
- Only took in the past

#### Years taken in past 10 years?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amount per day?
- 6 mcg
- 50 mcg
- 100 mcg
- 250 mcg
- Don't know

---

### Calcium, Tums®, or antacids with calcium*
- Yes, take now
- Only took in the past

#### Years taken?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amt. per day?
- 100 mg
- 250 mg
- 500 mg
- 800 mg
- 1000 mg
- 1500 mg
- Don't know

---

### Iron
- Yes, take now
- Only took in the past

#### Years taken?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amt. per day?
- 10 mg
- 18 mg
- 27 mg
- 50 mg
- Don't know

---

### Magnesium
- Yes, take now
- Only took in the past

#### Years taken?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amt. per day?
- 100 mg
- 250 mg
- 400 mg
- Don't know

---

### Zinc
- Yes, take now
- Only took in the past

#### Years taken?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amt. per day?
- 15 mg
- 30 mg
- 60 mg
- 100 mg
- Don't know

---

### Selenium
- Yes, take now
- Only took in the past

#### Years taken?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amt. per day?
- 25 mcg
- 50 mcg
- 100 mcg
- 200 mcg
- Don't know

---

### Chromium
- Yes, take now
- Only took in the past

#### Years taken?
- 1-3
- 4-6
- 7-9
- 10+

#### Days per week?
- 1-2
- 3-4
- 5-6
- 7

#### Closest amt. per day?
- 25 mcg
- 100 mcg
- 200 mcg
- Don't know
<table>
<thead>
<tr>
<th>Supplement</th>
<th>Years taken in past 10?</th>
<th>Days per week?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acidophilus pills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black cohosh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-enzyme Q10 (CoQ10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cranberry pills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dong quai</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish oil, EPA, omega-3 or cod liver oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garlic pills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ginseng</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For these HERBALS and OTHER COMPOUNDS, include pills, powders, tinctures, and teas taken regularly in the past 10 years. Regularly means at least once a week for a year. Mark all that apply.
LIFETIME USE OF SOME COMMON SUPPLEMENTS

29. Since you were 21, have you ever taken any of these supplements at least once a week for a year?

<table>
<thead>
<tr>
<th>Supplement</th>
<th>At least once a week for a year</th>
<th>Total years taken since age 21?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multivitamins</td>
<td>Yes</td>
<td>1-4</td>
</tr>
<tr>
<td>Vitamin C (not in multivitamin)</td>
<td>Yes</td>
<td>5-9</td>
</tr>
<tr>
<td>Vitamin E (not in multivitamin)</td>
<td>Yes</td>
<td>10-14</td>
</tr>
<tr>
<td>Calcium (not in multivitamin)</td>
<td>Yes</td>
<td>15-24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25+</td>
</tr>
</tbody>
</table>

FAMILY HISTORY

The next questions are about your birth mother and father (not adoptive or step).

30. Is your birth mother still alive?
   ○ Yes
   ○ No
   ○ Don’t know

31. How old is she (or how old was she when she died)?
   ○ 59 or younger
   ○ 60-69
   ○ 70-79
   ○ 80-89
   ○ 90 or older
   ○ Don’t know

32. Is your birth father still alive?
   ○ Yes
   ○ No
   ○ Don’t know

33. How old is he (or how old was he when he died)?
   ○ 59 or younger
   ○ 60-69
   ○ 70-79
   ○ 80-89
   ○ 90 or older
   ○ Don’t know

34. Did any of your natural parents, brothers or sisters (not adopted, step or half) have any of the following conditions? Mark all that apply.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Which relative(s)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer</td>
<td>○ Mother ○ One sister ○ 2 or more sisters</td>
</tr>
<tr>
<td>Ovarian cancer</td>
<td>○ Mother ○ One sister ○ 2 or more sisters</td>
</tr>
<tr>
<td>Uterus cancer</td>
<td>○ Mother ○ One sister ○ 2 or more sisters</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>Colon or rectal cancer</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>Bladder cancer</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>Pancreas cancer</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>Melanoma</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>Leukemia or</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>lymphoma</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
<tr>
<td>Heart attack</td>
<td>○ Mother ○ Father ○ Sister(s) ○ Brother(s)</td>
</tr>
</tbody>
</table>
### MEDICATIONS

35. **In the past month,** did you take any of the following medications at least once a week? 
   *Mark all that apply.*

<table>
<thead>
<tr>
<th>Medication</th>
<th>Days per week?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen (such as Tylenol® or Aspirin-free Excedrin®)</td>
<td>1-3 4-6 7</td>
</tr>
<tr>
<td>Aspirin (such as Anacin®, Bufferin®, Alka-Seltzer®, Bayer® or Excedrin®)</td>
<td></td>
</tr>
<tr>
<td>Baby or low-dose aspirin (81 mg)</td>
<td></td>
</tr>
<tr>
<td>Regular or extra-strength aspirin</td>
<td></td>
</tr>
<tr>
<td>Ibuprofen (such as Advil®, Motrin®, Nuprin® or Mediprin®)</td>
<td></td>
</tr>
<tr>
<td>Naproxen (such as Aleve®, Naprosyn®, Anaprox® or Naprelan®)</td>
<td></td>
</tr>
<tr>
<td>Celebrex™ (celecoxib) or Vioxx® (rofecoxib)</td>
<td></td>
</tr>
<tr>
<td>Other pain relievers (such as piroxicam or indomethacin)</td>
<td></td>
</tr>
<tr>
<td>Fiber products (such as Metamucil®, Citrucel®, FiberCon® or FbersAll®)</td>
<td></td>
</tr>
</tbody>
</table>

36. **Over the past 10 years,** about how many times have you taken non-fiber laxatives (such as Ex-lax®, Correctol® or milk of magnesia)?
   *Never or less than once per year*  *1-4 times per year*  *5-11 times per year*  *1-3 times per month*  *1 time per week or more*

37. **Over the last year,** about how many days did you take antibiotics?
   *None*  *1-14 days*  *15-59 days*  *60-179 days*  *180+ days (6 months or more)*
38. Over the last two weeks, have you taken any of the following prescription medications? Mark all that apply.
- Blood pressure medicine
- Cholesterol-lowering medicine
- Warfarin (such as Coumadin®)
- Insulin
- Pills for diabetes or to lower blood sugar
- Drugs for depression or anxiety
- Testosterone
- Fosamax®, Didroprol®, Evista® or Tamoxifen
- Zantac®, Pepcid AC®, Tagamet® or Avid®
- None of the above

40. Have you had a mammogram (an x-ray of the breasts) in the past two years?
- Yes
- No

41. Have you had a sigmoidoscopy or colonoscopy (a doctor inserts a tube in the rectum to check for bowel problems) in the past ten years?
- Yes
- No

42. Has a doctor ever told you that you had cancer?
- Yes → What kind of cancer did you have? Mark all that apply.
- Breast
- Cervix
- Uterus (womb)
- Ovary
- Lung
- Colon or rectum
- Bladder
- Kidney
- Pancreas
- Brain
- Thyroid
- Esophagus
- Oral (mouth, tongue or throat)
- Stomach
- Leukemia
- Hodgkin's disease
- Other lymphoma (non-Hodgkin’s lymphoma)
- Melanoma
- Skin (not melanoma)
- Other cancer

- No
43. Has a doctor ever told you that you had any of the following conditions?  
Mark all that apply.
- Rheumatoid arthritis
- Arthritis (not rheumatoid arthritis)
- Heart attack
- Heart failure/congestive heart failure
- Stroke
- Blood clot in your lungs
  (pulmonary embolus or PE)
- Blood clot in your leg
  (deep vein thrombosis)
- Angina (chest pain due to heart disease)
- Emphysema, chronic bronchitis
  or COPD
- Asthma
- Acid reflux disease (GERD)
- Ulcer (stomach or duodenal)
- Ulcerative colitis or Crohn’s disease
- Intestinal polyposis
- Pancreatitis (inflamed pancreas)
- Cirrhosis of the liver
- Viral hepatitis (A, B, C, D or E)
- Other chronic liver disease
- Kidney stones
- Kidney disease (not kidney stones)
- Multiple bladder infections (5 or more)
- Multiple yeast infections (3 or more)
- Parkinson’s disease
- Alzheimer’s disease
- Glaucoma
- Macular degeneration
  (loss of central vision)
- Migraine headaches
- Gingivitis
- None of the above

44. Since you were 50 years old, have you had a broken bone?
- Yes  Which bone(s)?
  - Hip
  - Wrist
  - Forearm (between wrist and elbow)
  - Other
- No

45. Over the past 10 years, how often did you feel constipated enough to take something, such as a laxative, enema or prunes?
- Never or less than once per year
- 1-4 times per year
- 5-11 times per year
- 1-3 times per month
- 1 time per week or more

46. How often do you usually have a bowel movement?
- 1 time per week or less
- 2-4 times per week
- 5-6 times per week
- 1 time per day
- 2 times per day
- 3 or more times per day

47. Over the last year, have you had any of the following conditions? Include conditions that you are treating, even if you don’t have symptoms. Mark all that apply.
- Chronic neck, back or joint pain
  (at least half the days of the year)
- Frequent indigestion or heartburn
  (at least half the days of the year)
- Lactose intolerance (intestinal problems
  after drinking milk)
- Fatigue or lack of energy
  (at least half the days of the year)
- Feeling depressed or anxious
  (at least half the days of the year)
- Frequent headaches
  (2 or more per week in last year)
- Numbness in fingers or feet
- Skin problems such as psoriasis or
  eczema (not acne)
- Anemia
- None of the above

48. Do you currently have allergies to any of the following? Mark all that apply.
- Plants, grasses or trees
- Mold or dust
- Cats, dogs or other animals
- Insect bites or stings
- Foods
- Medications
- Other
- None of the above
### WOMEN'S HEALTH

#### 49. How old were you when you had your first menstrual period?
- [ ] 11 or younger
- [ ] 12
- [ ] 13
- [ ] 14 or older
- [ ] Never had a period

#### 50. Have you ever given birth to a child?
*Do not include miscarriages in the first 5 months of pregnancy.*
- [ ] Yes
- [ ] No

#### a) How old were you when your first child was born?
- [ ] 19 or younger
- [ ] 20-24
- [ ] 25-29
- [ ] 30-34
- [ ] 35-39
- [ ] 40 or older

#### b) How many times have you given birth?
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5 or more

#### 51. Have you had periods in the last year?
- [ ] Yes
- [ ] Yes, but not regularly
- [ ] Yes, because I take hormones
- [ ] No

#### a) How old were you when your periods permanently stopped?
- [ ] 39 or younger
- [ ] 40-44
- [ ] 45-49
- [ ] 50-54
- [ ] 55 or older

#### b) Why did your periods stop?
- [ ] Natural menopause
- [ ] Surgery
- [ ] Other

#### 52. Have you had any of the following medical procedures?
- [ ] Hysterectomy (removal of womb)
- [ ] Both ovaries removed
- [ ] One ovary removed
- [ ] Tubal ligation (tubes tied)
- [ ] None of the above

---

#### 53. Have you ever taken birth control pills (for any reason)?
- [ ] Yes
- [ ] No

#### a) How many years (total) did you take birth control pills?
- [ ] Less than 1 year
- [ ] 1-4 years
- [ ] 5-9 years
- [ ] 10-14 years
- [ ] 15 years or more

#### 54. Have you ever used estrogen (female hormone) pills or patches?
*Only include pills or patches that require a doctor's prescription. Do not include birth control pills.*
- [ ] Yes
- [ ] No

#### a) How old were you when you first used estrogen?
- [ ] 39 or younger
- [ ] 40-44
- [ ] 45-49
- [ ] 50-54
- [ ] 55 or older

#### b) How many years (total) have you used (or did you use) estrogen?
- [ ] Less than 1 year
- [ ] 1-4 years
- [ ] 5-9 years
- [ ] 10-14 years
- [ ] 15 years or more

#### c) Do you take estrogen now?
- [ ] Yes
- [ ] No

#### 55. Have you ever used progesterone?
*Progesterone can be a separate pill (such as Provera®) or combined with estrogen in one pill or patch (such as Prempro® or Premphase®).*
- [ ] Yes
- [ ] No

#### a) How many years (total) have you used (or did you use) progesterone?
- [ ] Less than 1 year
- [ ] 1-4 years
- [ ] 5-9 years
- [ ] 10 years or more
These questions are about the types of foods you ate during the past month.

56. Did you eat chicken or turkey?
   - Yes ➤ When you ate chicken or turkey, how often did you eat the skin?
     - Almost always
     - Often
     - Sometimes
     - Rarely
     - Never
   - No ➤

57. Did you eat beef, pork, ham or lamb?
   - Yes ➤ When you ate beef, pork, ham or lamb, how often did you eat the fat?
     - Almost always
     - Often
     - Sometimes
     - Rarely
     - Never
   - No ➤

58. Did you eat hamburger or other ground meat?
   - Yes ➤ When you ate hamburger or other ground meat, was it usually...
     - Regular
     - Lean
     - Extra lean
     - Ground chicken or turkey
     - Don't know
   - No ➤

59. Did you put milk, cream or creamer on cereal?
   - Yes ➤ When you put milk, cream or creamer on cereal, what type did you usually use?
     - Mark one or two.
     - Cream or half and half
     - Whole milk
     - 2% milk
     - 1% milk or buttermilk
     - Nonfat or skim milk
     - Acidophilus milk
     - Soy milk
     - Non-dairy creamer
     - Don't know
   - No ➤

60. Did you drink milk? Also include beverages made with milk such as lattes or hot chocolate.
   - Yes ➤ When you drank milk or beverages made with milk, was it usually...
     - Mark one or two.
     - Whole milk
     - 2% milk
     - 1% milk or buttermilk
     - Nonfat or skim milk
     - Acidophilus milk
     - Soy milk
     - Don't know
   - No ➤
During the past month...

61. Did you eat cold cereal?
   - Yes
   - No
   - Highly fortified cereals (100% of daily values) such as Total®, Smart Start® and Product 19®
   - High fiber or bran cereals such as Raisin Bran® and All Bran®
   - Regular granola (not lowfat)
   - All other cereals such as lowfat granola, Cheerios® and Corn Flakes®

62. In your household, what kinds of fat were usually used for cooking, for example to flavor vegetables or fry meat? Mark one or two.
   - Butter
   - Stick margarine
   - Tub or liquid margarine
   - Lowfat margarine
   - Olive oil
   - Canola oil
   - Other oils such as corn, soybean, safflower or peanut
   - Lard, bacon fat or meat drippings
   - Didn't use fat or used non-stick spray (Pam®)

63. What kinds of fat did you use at the table, for example on breads, vegetables or potatoes? Mark one or two.
   - Butter
   - Stick margarine
   - Tub or liquid margarine
   - Lowfat margarine
   - Olive oil
   - Sour cream
   - Didn't use fat

64. What type of salad dressing did you usually use? Mark one or two.
   - Regular, including oil and vinegar
   - Low or reduced fat
   - Fat free or nonfat
   - Didn't use salad dressing

65. What type of mayonnaise did you usually use?
   - Regular
   - Low or reduced fat
   - Fat free or nonfat
   - Didn't use mayonnaise

66. Did you eat cookies or cakes?
   - Yes
   - No
   - When you ate cookies or cakes, how often were they fig bars, SnackWell's®, angel food cakes, or other types of low or nonfat cookies or cakes?
     - Almost always
     - Often
     - Sometimes
     - Rarely
     - Never

67. Did you drink orange, grapefruit or other fruit juices?
   - Yes
   - No
   - Were any of these vitamins or minerals added (specially fortified) to the juices you drank? Mark all that apply.
     - Extra vitamin C
     - Vitamin E
     - Calcium
     - None
     - Don't know

68. On average, how many times a day did you eat (meals plus snacks)? Snacks include food, milk and milk beverages such as lattes. Coffee, tea and soft drinks alone do not count as snacks.
   - 1 time per day
   - 2 times per day
   - 3 times per day
   - 4 times per day
   - 5 times per day
   - 6 times per day
   - 7 or more
69. Mark the column to show how often you usually ate each food over the past month. Mark your usual serving size as small, medium or large.

- A small serving is about one-half (1/2) the medium serving size or less.
- A large serving is about one-and-a-half (1 1/2) times the medium serving size or more.
- Some pages have pictures to help you estimate the amount of food you usually eat.

### How often did you eat the food last month?

<table>
<thead>
<tr>
<th>HOW OFTEN DID YOU EAT THE FOOD LAST MONTH?</th>
<th>AMOUNT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEVER or less than once per month</td>
<td>1 per week</td>
</tr>
<tr>
<td>CEREALS, BREADS, SNACKS</td>
<td></td>
</tr>
<tr>
<td>Cold cereal</td>
<td></td>
</tr>
<tr>
<td>Cooked cereals and grits</td>
<td></td>
</tr>
<tr>
<td>Milk on cereal (cold and cooked)</td>
<td></td>
</tr>
<tr>
<td>Pancakes, French toast and waffles</td>
<td></td>
</tr>
<tr>
<td>Muffins, scones, croissants and biscuits</td>
<td></td>
</tr>
<tr>
<td>White breads, including bagels, rolls and English muffins</td>
<td></td>
</tr>
<tr>
<td>Dark breads, including dark bagels and rolls</td>
<td></td>
</tr>
<tr>
<td>Butter or margarine on breads, hot cereals, pancakes, etc.</td>
<td></td>
</tr>
<tr>
<td>Jam, jelly, honey and syrup</td>
<td></td>
</tr>
<tr>
<td>Granola bars and cereal bars such as Nutri-Grain Bars®</td>
<td></td>
</tr>
<tr>
<td>Sports or meal replacement bars such as Power Bars® and Clif Bars®</td>
<td></td>
</tr>
<tr>
<td>Low or nonfat potato and tortilla chips, pretzels, and plain or lowfat microwave popcorn</td>
<td></td>
</tr>
<tr>
<td>Regular potato and tortilla chips, puffs and microwave or buttered popcorn</td>
<td></td>
</tr>
<tr>
<td>Low or nonfat crackers, such as saltines and SnackWell's®</td>
<td></td>
</tr>
<tr>
<td>Regular crackers, such as Ritz® and Wheat Thins®</td>
<td></td>
</tr>
<tr>
<td>Peanut butter, peanuts and other nuts and seeds</td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE DO NOT WRITE IN THIS AREA**

SERIAL #
### MEAT, FISH, EGGS

<table>
<thead>
<tr>
<th>HOW OFTEN DID YOU EAT THE FOOD LAST MONTH?</th>
<th>AMOUNT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEVER or less than once per month</td>
<td><strong>NEVER or less than once per month</strong></td>
</tr>
<tr>
<td>1 per month</td>
<td><strong>1 per month</strong></td>
</tr>
<tr>
<td>2-3 per month</td>
<td><strong>2-3 per month</strong></td>
</tr>
<tr>
<td>1 per week</td>
<td><strong>1 per week</strong></td>
</tr>
<tr>
<td>2-3 per week</td>
<td><strong>2-3 per week</strong></td>
</tr>
<tr>
<td>5-6 per week</td>
<td><strong>5-6 per week</strong></td>
</tr>
<tr>
<td>1 per day</td>
<td><strong>1 per day</strong></td>
</tr>
<tr>
<td>2+ per day</td>
<td><strong>2+ per day</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MEDIUM SERVING SIZE</strong></th>
<th>S</th>
<th>M</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eggs</td>
<td>2 eggs</td>
<td>3 strips or 2 links</td>
<td></td>
</tr>
<tr>
<td>Bacon and breakfast sausage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low or reduced fat hot dogs and sausage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular hot dogs and sausage such as bratwurst and chorizo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch meats such as ham, turkey and lowfat bologna</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other lunch meat such as bologna, salami and Spam®</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canned tuna, tuna salad and tuna casserole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef, pork, ham and lamb</td>
<td>4 ounces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground meat, including hamburgers and meatloaf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver, chicken liver and organ meats</td>
<td>4 ounces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fried chicken, including chicken nuggets and tenders</td>
<td>1 large piece or 6 nuggets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken and turkey (roasted, stewed or broiled)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fried fish, fish sandwich and fried shellfish (shrimp, oysters)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shellfish, not fried (shrimp, lobster, crab and oysters)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White fish (broiled or baked) such as sole, halibut and cod</td>
<td>4 ounces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark fish (broiled or baked) such as salmon and fresh tuna</td>
<td>4 ounces</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SAUCES and CONDIMENTS

<table>
<thead>
<tr>
<th><strong>SAUCES and CONDIMENTS</strong></th>
<th><strong>SAUCES and CONDIMENTS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>NEVER or less than once per month</td>
<td><strong>NEVER or less than once per month</strong></td>
</tr>
<tr>
<td>1 per month</td>
<td><strong>1 per month</strong></td>
</tr>
<tr>
<td>2-3 per month</td>
<td><strong>2-3 per month</strong></td>
</tr>
<tr>
<td>1 per week</td>
<td><strong>1 per week</strong></td>
</tr>
<tr>
<td>2-3 per week</td>
<td><strong>2-3 per week</strong></td>
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<tr>
<td>5-6 per week</td>
<td><strong>5-6 per week</strong></td>
</tr>
<tr>
<td>1 per day</td>
<td><strong>1 per day</strong></td>
</tr>
<tr>
<td>2+ per day</td>
<td><strong>2+ per day</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MEDIUM SERVING SIZE</strong></th>
<th>S</th>
<th>M</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat gravies</td>
<td>½ cup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketchup</td>
<td>2 Tbsp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salsa (as dip or on foods)</td>
<td>¼ cup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mayonnaise and mayonnaise-type spreads</td>
<td>2 Tbsp.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## SPAGHETTI, MIXED DISHES, SOUPS

<table>
<thead>
<tr>
<th></th>
<th>NEVER or less than once per month</th>
<th>1 per month</th>
<th>2-3 per month</th>
<th>1 per week</th>
<th>2 per week</th>
<th>3-4 per week</th>
<th>5-6 per week</th>
<th>1 per day</th>
<th>2+ per day</th>
<th>AMOUNT?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium serving size</td>
<td>S</td>
<td>M</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stew, pot pie and casserole with meat or chicken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Chili with meat and beans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Spaghetti, lasagna and other pasta with meat sauce</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Spaghetti and other pasta with tomato sauce (no meat)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Spaghetti and other pasta with oil, cheese or cream sauce, including macaroni and cheese</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Asian-style (stir-fried) noodles and rice, such as chow mein, fried rice and pad Thai</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Tofu, tempeh and products such as tofu hot dogs, soy burgers and tofu cheese</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 ounces, 1 hot dog or 1 burger</td>
</tr>
<tr>
<td>Pizza</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1/4 of a 12&quot; pizza</td>
</tr>
<tr>
<td>Tacos, burritos and enchiladas</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 medium</td>
</tr>
<tr>
<td>Vegetable, minestrone and tomato soup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Cream soups such as potato, cheese and chowders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Bean soups such as pea, lentil and black bean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Miso soup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Ramen noodle soup</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
</tbody>
</table>

### DAIRY PRODUCTS

<table>
<thead>
<tr>
<th></th>
<th>NEVER or less than once per month</th>
<th>1 per month</th>
<th>2-3 per month</th>
<th>1 per week</th>
<th>2 per week</th>
<th>3-4 per week</th>
<th>5-6 per week</th>
<th>1 per day</th>
<th>2+ per day</th>
<th>AMOUNT?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium serving size</td>
<td>S</td>
<td>M</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cottage cheese and ricotta cheese</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Low or reduced fat cheese, including cheese used in cooking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 slice or 1/2 cup shredded</td>
</tr>
<tr>
<td>All other cheese, such as American, cheddar or cream cheese, including cheese used in cooking</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1 slice, 1/2 cup shredded or 2 Tbsp.</td>
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<tr>
<td>Yogurt, all types except frozen</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
</tbody>
</table>
## VEGETABLES and GRAINS

<table>
<thead>
<tr>
<th>HOW OFTEN DID YOU EAT THE FOOD LAST MONTH?</th>
<th>AMOUNT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEVER or less than once per month</td>
<td>S</td>
</tr>
<tr>
<td>1 per month</td>
<td>2-3 per month</td>
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</tbody>
</table>

Mark all vegetables you ate, including in salads, mixed dishes, sandwiches and stir-fries.

- **Green salad (lettuce or spinach)** 1 cup
- **Salad dressing (all types)** 2 Tbsp.
- **Fresh tomatoes** 1 medium or 4 slices
- **Carrots** 1/2 cup
- **Green and red peppers and chilies** 1/2 cup
- **Broccoli** 1/2 cup
- **Cauliflower, cabbage and Brussels sprouts** 1/2 cup
- **Green or string beans** 1/2 cup
- **Green peas** 1/2 cup
- **Corn** 1/2 cup
- **Summer squash, zucchini and okra** 1/2 cup
- **Winter squash such as acorn and butternut, sweet potatoes and yams** 1/2 cup
- **Cooked greens such as spinach, mustard greens and collards** 1/2 cup
- **Onions and leeks** 1/2 cup
- **Fresh garlic, including in cooking** 1 clove
- **Avocado and guacamole** 1/2 medium or 1/4 cup
- **French fries, fried potatoes and hash browns** 1/4 cup
- **Potatoes (boiled, baked or mashed)** 1 medium or 1/2 cup
- **Beans such as baked, refried and chili without meat** 1/2 cup
- **Coleslaw** 1/2 cup
- **Potato, macaroni and pasta salads made with mayonnaise or oil** 1/2 cup
- **Rice, noodles and other grains (as a side dish)** 1/4 cup
- **Butter, margarine, sour cream and other fat added to vegetables, potatoes and rice** 1 pat or 1 teaspoon
## HOW OFTEN DID YOU EAT THE FOOD LAST MONTH?

<table>
<thead>
<tr>
<th>FRUITS</th>
<th>NEVER or less than once per month</th>
<th>1 per month</th>
<th>2-3 per month</th>
<th>1 per week</th>
<th>2 per week</th>
<th>3-4 per week</th>
<th>5-6 per week</th>
<th>1 per day</th>
<th>2+ per day</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Medium serving size</td>
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<tr>
<td></td>
<td>Apples, applesauce and pears</td>
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<td></td>
<td>Bananas</td>
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<td></td>
<td>Peaches, nectarines and plums</td>
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<td></td>
<td>(in season)</td>
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<td></td>
<td>Apricots (fresh, canned or dried)</td>
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<td></td>
<td>Dried fruit (other than apricots)</td>
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<tr>
<td></td>
<td>such as raisins and prunes</td>
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<td></td>
<td>Oranges, grapefruit and</td>
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<tr>
<td></td>
<td>tangerines (not juice)</td>
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<td></td>
<td>Berries such as strawberries</td>
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<td></td>
<td>and blueberries (in season)</td>
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<td></td>
<td>Cantaloupe, other melons and</td>
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<td></td>
<td>mango (in season)</td>
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<td></td>
<td>Any other fruit such as grapes,</td>
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<td></td>
<td>fruit, cocktail, pineapple and</td>
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<tr>
<td></td>
<td>cherries</td>
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<td></td>
<td>SWEETS</td>
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<tr>
<td></td>
<td>Low or nonfat frozen desserts</td>
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<tr>
<td></td>
<td>such as lowfat ice cream, frozen</td>
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<tr>
<td></td>
<td>yogurt and sherbet</td>
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<td></td>
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<tr>
<td></td>
<td>Ice cream and milkshakes</td>
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<tr>
<td></td>
<td>Pudding, custard and flan</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Doughnuts, pies and pastries</td>
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<tr>
<td></td>
<td>Cookies and cakes</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Chocolate, candy bars</td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>and toffee</td>
<td></td>
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</tr>
</tbody>
</table>

### Please answer these three important questions.

- **How often did you use fat to pan-fry, sauté or deep-fry foods?** Count all fat such as margarine, butter, oil or lard.
- **How often did you eat a serving of vegetables?** Do not count potatoes, salad or beans.
- **How often did you eat a serving of fruit?** Do not count juices.
### BEVERAGES and ALCOHOL

#### 70. How often did you drink these beverages last month?

<table>
<thead>
<tr>
<th>Beverage Description</th>
<th>NEVER or less than once per month</th>
<th>1-3 per month</th>
<th>1 per week</th>
<th>2-4 per week</th>
<th>5-6 per week</th>
<th>1 per day</th>
<th>2-3 per day</th>
<th>4-5 per day</th>
<th>6+ per day</th>
<th>AMOUNT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk as a beverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Latte, mocha or hot chocolate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Coffee (not lattes or mochas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Tea (all types)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Milk, cream or creamer added to coffee and tea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Tbsp</td>
</tr>
<tr>
<td>Tomato juice, V-8® and other vegetable juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>⅛ cup</td>
</tr>
<tr>
<td>Orange juice and grapefruit juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>⅛ cup</td>
</tr>
<tr>
<td>Cranberry juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>⅛ cup</td>
</tr>
<tr>
<td>Other 100% fruit juice, such as apple and grape</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>⅛ cup</td>
</tr>
<tr>
<td>Fruit drinks fortified with vitamin C, such as Hi-C®</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>⅛ cup</td>
</tr>
<tr>
<td>Meal replacement drinks such as Slim-Fast®, Ensure® and Carnation Instant Breakfast®</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Diet soft drinks</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 ounces or 1 can</td>
</tr>
<tr>
<td>Regular soft drinks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 ounces or 1 can</td>
</tr>
<tr>
<td>Water (tap or bottled)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 cup</td>
</tr>
<tr>
<td>Beer (all types)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12-ounce can or bottle</td>
</tr>
<tr>
<td>Red wine</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 medium glass (4 oz)</td>
</tr>
<tr>
<td>White or rosé wine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 medium glass (4 oz)</td>
</tr>
<tr>
<td>Liquor and mixed drinks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 shot (1⅛ oz) or 1 mixed drink</td>
</tr>
</tbody>
</table>

**Note that the frequency headings are different.**

---

#### 71. On average, how many drinks of alcohol did you have at each of the following ages?  
*One drink is a 12-ounce bottle or can of beer, a 4-ounce glass of wine, a shot of liquor or a mixed drink.*

<table>
<thead>
<tr>
<th>Number of drinks?</th>
<th>None</th>
<th>Less than 1 per week</th>
<th>1-6 per week</th>
<th>1 per day (7-13 per week)</th>
<th>2-3 per day (14-27 per week)</th>
<th>4+ per day (28+ per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 18</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Age 30</td>
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<tr>
<td>Age 45</td>
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</tr>
</tbody>
</table>
PERSONAL CHARACTERISTICS

72. What was your height when you were the tallest?
   ______ ft ______ inches

73. How old were you when you first reached that height?
   ______ ______ years old

74. What was your weight at each of the following ages?
   Now ______ ______ pounds
   Age 18 ______ ______ pounds
   Age 30 ______ ______ pounds
   Age 45 ______ ______ pounds

75. If your skin was exposed to strong sunlight for the first time in summer for one hour (without sunscreen), would you...
   Mark only one.
   ○ Get a severe sunburn with blistering
   ○ Have a painful sunburn for a few days followed by peeling
   ○ Get mildly burned followed by some degree of tanning
   ○ Tan without any sunburn
   ○ None of the above/don’t know

76. Between the ages of 10 and 20:
   a) Did you have natural blond or red hair?
      ○ Yes
      ○ No
   b) Did you have a lot of freckles on your arms?
      ○ Yes
      ○ No
   c) Did you have 3 or more severe sunburns with blisters or pain lasting 3 or more days?
      ○ Yes
      ○ No

YOUR BACKGROUND

77. When were you born?
   M M D D / Y Y

78. Where were you born?
   City ____________________________ State or Country (if not US)

79. What is your current marital status?
   ○ Married
   ○ Living with a partner
   ○ Never married
   ○ Separated or divorced
   ○ Widowed

80. What is the highest level of school that you have completed? Mark only one.
   ○ Grade school or some high school
   ○ High school graduate or G.E.D.
   ○ Some college/technical school
   ○ College graduate (4-year degree)
   ○ Advanced degree (such as MS, JD, PhD)

81. Which of the following best describes your racial or ethnic background? Mark all that apply.
   ○ White
   ○ Hispanic
   ○ Black or African American
   ○ American Indian or Alaska Native
   ○ Asian or Pacific Islander
   ○ Other

82. What was your household income last year? (Optional)
   ○ Less than $20,000
   ○ $20,000 - $39,999
   ○ $40,000 - $59,999
   ○ $60,000 - $79,999
   ○ $80,000 or more
Appendix C: Longitudinal Study of Women’s Health (LSWH) Questionnaire
Welcome to the Longitudinal Study of Women's Health!
Thank you for participating in our survey. This research study is hoping to answer some important questions about the health of women thirty to fifty years of age. We are interested in the health and risk of obesity in women in different economic situations. We hope that by understanding these relationships better programs, services, and interventions can be developed to help women stay healthier as they age.

This survey includes questions about your eating habits, exercise habits, general health and level of stress in your life, as well as questions about your family, income level, and neighborhood. Do you have any questions before you begin?

If you have any questions about your rights as a participant in this study, please call the Humans Subjects Division at the University of Washington at (206) 543-0098.

Please direct any study-related questions to Denise Albano, Project Coordinator, at (206) 616-5153.

Thank you again for your participation!
Sueko A. Naka, Ph.D. & Deborah J. Brown, Ph.D., Principal Investigators

General Instructions
Please answer all the questions by marking the appropriate box or writing in the space provided. If you don’t know the answer to a question, give your best guess.

Example
For the following statements, mark an X in the box that indicates how much you agree or disagree.

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>X. I would like to learn about easy ways to prepare vegetables and fruits.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
FIRST WE WOULD LIKE TO KNOW ABOUT YOUR GENERAL HEALTH

1. In general, would you say your health is? (Give your best guess. Mark one answer.)
   - □ 1 Excellent
   - □ 2 Very good
   - □ 3 Good
   - □ 4 Fair
   - □ 5 Poor

2. Compared to one year ago, how would you rate your health in general now? (Give your best guess. Mark one answer.)
   - □ 1 Much better now than one year ago
   - □ 2 Somewhat better now than one year ago
   - □ 3 About the same as one year ago
   - □ 4 Somewhat worse now than one year ago
   - □ 5 Much worse now than one year ago

NOW, WE'LL LIKE TO KNOW ABOUT YOUR EATING CHOICES

When answering the following questions, think of your typical eating choices. Think about how often you eat at home or eat out. Also, think about which meals you usually skip, if you skip any.

Sample Serving Size

| A serving is ¼ cup dried fruit | A serving is one medium piece of fruit | A serving is ½ cup of cooked vegetables | A serving is 6 ounces of 100% fruit juice | A serving is 1 cup of salad |

Note:
- Please include vegetables in soups, stir-fry, and other mixed dishes.
- "100% juice from concentrate" is considered juice.
- Other fruit drinks such as "fruit juice cocktail," "juice beverage," or "10% juice are not counted as fruit juice.

3. How many servings of fruits and vegetables do you eat each day? (Give your best guess. Mark one answer.)
   - □ 0
   - □ 1
   - □ 2
   - □ 3
   - □ 4
   - □ 5
   - □ 6
   - □ 7
   - □ 8
   - □ 9
   - □ 10
   - □ 11 OR MORE
4. Thinking about how often you eat out, how many times in a week or month do you eat breakfast, lunch or dinner in a place such as McDonald’s®, Burger King®, Wendy’s®, Arby’s®, Pizza Hut®, or Kentucky Fried Chicken®? (Give your best guess. Write one answer.)

<table>
<thead>
<tr>
<th>______ times per week</th>
<th>OR</th>
<th>______ times per month</th>
<th>OR</th>
<th>______ times per year</th>
</tr>
</thead>
</table>

5. How often do you drink soft drinks or soda pop (regular or diet)? (Give your best guess. Mark one answer.)

- □ Never
- □ Less than once a week
- □ About once a week
- □ 2-5 times per week
- □ About once a day
- □ 2 or more times per day

6. How often do you eat food (meals or snacks) while doing another activity, for example, watching TV, working at a computer, reading, driving, playing video games? (Give your best guess. Mark one answer.)

- □ Never
- □ Seldom
- □ Sometimes
- □ Most of the time
- □ Always

Next are some questions about what you have had to eat and drink in the last month.

7. In the past month, how often did you drink 100% orange or grapefruit juice? (Give your best guess. Mark one answer.)

<table>
<thead>
<tr>
<th>□ Never</th>
<th>□ 1 time a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 1-3 times a month</td>
<td>□ 2 times a day</td>
</tr>
<tr>
<td>□ 1-2 times a week</td>
<td>□ 3 times a day</td>
</tr>
<tr>
<td>□ 3-4 times a week</td>
<td>□ 4 times a day</td>
</tr>
<tr>
<td>□ 5-6 times a week</td>
<td>□ 5 times a day</td>
</tr>
</tbody>
</table>

8. In the past month, how often did you drink other 100% fruit juices, NOT COUNTING fruit drinks like Hi-C®, Kool-Aid®, or Tang®? (Give your best guess. Mark one answer.)

<table>
<thead>
<tr>
<th>□ Never</th>
<th>□ 1 time a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 1-3 times a month</td>
<td>□ 2 times a day</td>
</tr>
<tr>
<td>□ 1-2 times a week</td>
<td>□ 3 times a day</td>
</tr>
<tr>
<td>□ 3-4 times a week</td>
<td>□ 4 times a day</td>
</tr>
<tr>
<td>□ 5-6 times a week</td>
<td>□ 5 times a day</td>
</tr>
</tbody>
</table>
9. In the past month, how often did you eat green salad (with or without other vegetables)? (Give your best guess. Mark one answer.)

- Never
- 1-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 times a day
- 5 times a day

10. In the past month, how often did you eat French fries or fried potatoes? (Give your best guess. Mark one answer)

- Never
- 1-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 times a day
- 5 times a day

11. In the past month, how often did you eat baked, boiled, or mashed potatoes? (Give your best guess. Mark one answer.)

- Never
- 1-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 times a day
- 5 times a day

12. In the past month, about how many servings of vegetables did you eat per week or per day (not counting potatoes or salad)? (Give your best guess. Mark one answer.)

- Never
- 1-3 per month
- 1-2 per week
- 3 per month
- 3-4 per week
- 1 per day
- 2 per day
- 4 per day
- 5 or more per day
- 5 per week
- 5 or more per day

13. In the past month, about how often did you eat fruit, NOT COUNTING juices? (Give your best guess. Mark one answer.)

- Never
- 1-3 times a month
- 1-2 times a week
- 3-4 times a week
- 5-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 times a day
- 5 times a day
The next question is whether you are making healthy eating choices. Our definition of “Healthy eating” or a “Healthy diet” is eating plenty of fruits, vegetables and limiting foods with too much sugar or fat.

14. On a scale from 1 to 5, how much are you eating a healthy diet? (Give your best guess. Mark one answer.)

15. How long have you been following a healthy diet? Would you say… (Give your best guess. Mark one answer.)
- Less than 1 month
- 1 to 5 months
- 6 to 11 months
- 1 year or more

16. In the past 6 months, have you tried to eat a healthier diet? (Mark one answer)
- No
- Yes

17. How successful were you? Would you say…
- Very successful
- Somewhat successful
- Not successful

18. In the past month, have you seriously thought about the changes you could make to eat a healthier diet? (Mark one answer)
- No
- Yes

19. Do you plan on continuing trying to eat a healthier diet over the next 6 months?
- No
- Yes

20. How confident are you that you can change your diet to eat a healthy diet? Would you say… (Give your best guess. Mark one answer.)
- Not very confident
- Somewhat confident
- Very confident
- Don't know
21. On a scale of 1 to 4, to what extent do you believe that obesity is caused by not eating a healthy diet? (Give your best guess. Mark one answer.)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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<th>4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Don’t believe at all</td>
<td>Believe a little</td>
<td>Believe quite a bit</td>
<td>Believe a lot</td>
</tr>
</tbody>
</table>

22. On a scale of 0 to 10, how sure are you that you will eat less sugar and fat during the next year? (Give your best guess. Mark one answer.)

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<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not sure</td>
<td>Very sure</td>
<td></td>
<td></td>
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</tbody>
</table>

23. On a scale of 0 to 10, do you believe that eating too much sugar and fat is harmful to your health? (Give your best guess. Mark one answer.)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>Not at all harmful</td>
<td>Very harmful</td>
<td></td>
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</table>
THE NEXT QUESTIONS ARE ABOUT YOUR PHYSICAL ACTIVITY

24. Considering a 7-day period (1 week), how many times on average do you complete strenuous, moderate, or mild physical activity for more than 10 minutes during your free time? (Write the appropriate number on the line provided.)

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Example Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strenuous Activities</td>
<td>Aerobics Classes, Jogging, Running, or Power Walking, Fast swimming</td>
</tr>
<tr>
<td>Moderate activities</td>
<td>Fast walking, Moderate Gardening, Fast Dancing, Medium Pace Wheeling</td>
</tr>
<tr>
<td>Mild activities</td>
<td>Light Swimming, Light Vacuuming, Light yard work (without much bending and stooping)</td>
</tr>
</tbody>
</table>

a. Strenuous Activities
   - your heart rate increases a lot.
   - you can’t talk or your talking is broken up by large breaths.
   ___ times per week (Write your answer in the space.)

b. Moderate activities
   - your heart beats faster than normal.
   - you can talk but not sing.
   ___ times per week (Write your answer in the space.)

c. Mild activities
   - your heart beats slightly faster than normal.
   - you can talk and sing.
   ___ times per week (Write your answer in the space.)

25. Considering a 7-day period (1 week), during your free time, how often do you engage in any regular activity long enough to make you sweat? (Give your best guess. Mark one answer.)

- [ ] Often
- [x] Sometimes
- [ ] Never/Rarely
26. a. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure. *(Give your best guess. Write your answer below.)*

    ________ days per week **OR** □ None → GO TO QUESTION 27

b. How much time in total did you usually spend walking on one of those days? *(Give your best guess. Write your answer below.)*

    _____ hours _____ minutes

Think about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television.

27. During the **last 7 days**, how much time did you usually spend sitting on a **weekday** *(for example Monday or Tuesday)*? *(Give your best guess. Write your answer in the box below.)*

    ________ : _________ per day

    hours : minutes

28. During the **last 7 days**, how much time did you usually spend sitting on a **weekend day** *(on Saturday or Sunday)*? *(Give your best guess. Write your answer in the box below.)*

    ________ : _________ per day

    hours : minutes

The next question is whether you do regular exercise. Our definition of “Regular Exercise” is any **planned physical activity** *(e.g. brisk walking, aerobics, jogging, bicycling, swimming, etc.)* performed to increase physical fitness, 3 to 5 times per week for at least 20 minutes.

29. Do you exercise regularly? *(Mark one answer.)*

    □ No [ ] Yes → Go to Question 31

30. **IF “No” to Q 29,** in the future, do you intend to exercise regularly? *(Give your best guess. Mark one answer.)*

    □ No, I have no plans to exercise regularly

    □ I intend to exercise regularly in the next 30 days

    □ I intend to exercise regularly in the next 6 months → Go to Question 32
31. **IF “Yes” to Q 29, how long have you been exercising regularly?** *(Give your best guess. Mark one answer.)*

- [ ] I have been exercising regularly for less than 6 months
- [ ] I have been exercising regularly for more than 6 months

32. **On a scale of 1 to 4, to what extent do you believe that obesity is caused by not exercising regularly?** *(Give your best guess. Mark one answer.)*

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<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Don’t believe at all</td>
<td>Believe a little</td>
<td>Believe quite a bit</td>
<td>Believe a lot</td>
</tr>
</tbody>
</table>

33. **On a scale of 0 to 10, how sure are you that you will exercise regularly during the next year?** *(Give your best guess. Mark one answer.)*

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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not sure</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Very sure</td>
</tr>
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</table>

34. **On a scale of 0 to 10, do you believe that not exercising regularly (at least 3 times a week) is harmful to your health?** *(Mark one number.)*

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<tbody>
<tr>
<td>0</td>
<td>Not at all harmful</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very harmful</td>
</tr>
</tbody>
</table>

**THESE NEXT QUESTIONS ARE ABOUT YOUR WEIGHT**

35. **From the nine pictures below please select the image that you feel best represents you.** *(Give your best guess. Mark one answer below.)*

- [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
36. These next questions are about the health behaviors of your family and friends. Think about your 5 closest friends and 5 closest family members and their eating, exercise behaviors and their body weight.

**Of your five closest friends...**

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<tbody>
<tr>
<td>a. How many are overweight?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
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<tr>
<td>b. How many eat a healthy diet?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
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<tr>
<td>c. How many are physically active?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
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**Of your five closest family members...**

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</thead>
<tbody>
<tr>
<td>d. How many are overweight?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tbody>
<tr>
<td>e. How many eat a healthy diet?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
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<tbody>
<tr>
<td>f. How many are physically active?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

37. On a scale of 1 to 4, to what extent do you believe that obesity is inherited? *(Give your best guess. Mark one answer.)*

- □ | 1 |
  - Don't believe at all

- □ | 2 |
  - Believe a little

- □ | 3 |
  - Believe quite a bit

- □ | 4 |
  - Believe a lot
38. Below is a list of statements about your quality of life in relation to your weight. For each of the following statements, please mark an X in the one box that best describes your feelings.

<table>
<thead>
<tr>
<th>(Mark one answer per row.)</th>
<th>Not at all</th>
<th>Hardly</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>A good deal</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Because of my weight, I try to wear clothes that hide my shape.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. I feel frustrated that I have less energy because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. I feel guilty when I eat because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>d. I am bothered by what other people say about my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>e. Because of my weight, I try to avoid having my photograph taken.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>f. Because of my weight, I have to pay close attention to personal hygiene.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>g. My weight prevents me from doing what I want to do.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>h. I worry about the physical stress that my weight puts on my body.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>i. I feel frustrated that I am not able to eat what others do (eat) because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>j. I feel depressed because of my weight</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>k. I feel ugly because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>l. I worry about the future because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>m. I envy people who are thin.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>n. I feel that people stare at me because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>o. I have difficulty accepting my body because of my weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>p. I am afraid that I will gain back any weight that I lose.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>q. I get discouraged when I try to lose weight.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
39. On a scale of 0 to 10, how sure are you that you will control your weight next year? *(Give your best guess. Mark one answer.)*

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not sure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very Sure</td>
</tr>
</tbody>
</table>

40. On a scale of 0 to 10, do you believe being overweight (20 or more pounds) is harmful for your health? *(Give your best guess. Mark one answer.)*

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not at all harmful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very Harmful</td>
</tr>
</tbody>
</table>

The next statements are about your eating habits and your weight.

*(Give your best guess. Mark one answer per row.)*

<table>
<thead>
<tr>
<th></th>
<th>Definitely False</th>
<th>Mostly False</th>
<th>Mostly True</th>
<th>Definitely True</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. I deliberately (choose) take small helpings (portions) to control my weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. I start to eat when I feel anxious.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. Sometimes when I start eating, I just can’t seem to stop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. When I feel sad, I often eat too much.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. I don’t eat some foods because they make me fat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. Being with someone who is eating often makes me want to also eat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47. When I feel tense or ‘wound up’, I often feel I need to eat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48. I often get so hungry that my stomach feels like a bottomless pit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49. I’m always so hungry that it’s hard for me to stop eating before finishing all of the food on my plate.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50. When I feel lonely, I console myself by eating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51. I consciously hold back on how much I eat at meals to keep from gaining weight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Give your best guess. Mark one answer per row.)</td>
<td>Definitely False</td>
<td>Mostly False</td>
<td>Mostly True</td>
<td>Definitely True</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------------</td>
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<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>52. When I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to keep from eating—even if I’ve just finished a meal.</td>
<td>☐ 3</td>
<td>☐ 2</td>
<td>☐ 1</td>
<td>☐ 0</td>
</tr>
<tr>
<td>53. I’m always hungry enough to eat at any time.</td>
<td>☐ 3</td>
<td>☐ 2</td>
<td>☐ 1</td>
<td>☐ 0</td>
</tr>
<tr>
<td>54. If I feel nervous, I try to calm down by eating.</td>
<td>☐ 3</td>
<td>☐ 2</td>
<td>☐ 1</td>
<td>☐ 0</td>
</tr>
<tr>
<td>55. When I see something that looks very delicious, I often get so hungry that I have to eat right away.</td>
<td>☐ 3</td>
<td>☐ 2</td>
<td>☐ 1</td>
<td>☐ 0</td>
</tr>
<tr>
<td>56. When I feel depressed, I want to eat.</td>
<td>☐ 3</td>
<td>☐ 2</td>
<td>☐ 1</td>
<td>☐ 0</td>
</tr>
</tbody>
</table>

For the next two questions please give your best guess. Mark one answer per row.

<table>
<thead>
<tr>
<th>57. Do you go on eating binges (overeating) even though you’re not hungry?</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>At least once a week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐ 3</td>
<td>☐ 2</td>
<td>☐ 1</td>
<td>☐ 0</td>
</tr>
</tbody>
</table>

58. How often do you feel hungry? Only at meal times | Sometimes between meals | Often between meals | Almost always
| ☐ 3 | ☐ 2 | ☐ 1 |

THESE NEXT QUESTIONS ARE ABOUT YOUR GENERAL HEALTH

59. Do you have any of the following health conditions...?

- a. AIDS | ☐ 2 No | ☐ 1 Yes
- b. Cerebrovascular disease | ☐ 2 No | ☐ 1 Yes
- c. Chronic pulmonary disease | ☐ 2 No | ☐ 1 Yes
- d. Congestive heart failure | ☐ 2 No | ☐ 1 Yes
- e. Connective tissue disease | ☐ 2 No | ☐ 1 Yes
- f. Dementia | ☐ 2 No | ☐ 1 Yes
- g. Hemiplegia | ☐ 2 No | ☐ 1 Yes
- h. Leukemia | ☐ 2 No | ☐ 1 Yes
<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>Malignant lymphoma</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Myocardial infarction</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Peripheral vascular disease</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Ulcer disease</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Renal disease</td>
<td>No</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
<td>No</td>
<td>Yes, without end organ damage</td>
<td>Yes, with end organ damage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Malignant solid tumor</td>
<td>No</td>
<td>Yes, non-metastatic</td>
<td>Yes, Metastatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

60. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(Give your best guess. Mark one answer per row.)

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Lifting or carrying groceries?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>Climbing several flights of stairs?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>Climbing one flight of stairs?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>Bending, kneeling, or stooping?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>Walking more than a mile?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>Walking several hundred yards?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>Walking one hundred yards?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>Bathing or dressing yourself?</td>
<td>Yes, limited a lot</td>
<td>Yes, limited a little</td>
<td>No, not limited at all</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
61. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

<table>
<thead>
<tr>
<th>(Give your best guess. Mark one answer per row.)</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Cut down the amount of time you spent on work or other activities.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>b. Accomplished less than you would like.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>c. Were limited in the kind of work or other activities.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>d. Had difficulty performing the work or other activities (for example, it took extra effort)</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
</tbody>
</table>

62. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

<table>
<thead>
<tr>
<th>During the past 4 weeks have you…</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Cut down the amount of time you spent on work or other activities.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>b. Accomplished less than you would like.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
<tr>
<td>c. Didn't do work or other activities less carefully than usual.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
<td>☐ 5</td>
</tr>
</tbody>
</table>

63. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors or groups?

- ☐ 1 Not at all
- ☐ 2 Slightly
- ☐ 3 Moderately
- ☐ 4 Quite a bit
- ☐ 5 Extremely

64. How much bodily pain have you had during the past 4 weeks?

- ☐ 1 None
- ☐ 2 Very mild
- ☐ 3 Mild
- ☐ 4 Moderate
- ☐ 5 Severe
- ☐ 6 Very Severe

65. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and house work)?

- ☐ 1 Not at all
- ☐ 2 Slightly
- ☐ 3 Moderately
- ☐ 4 Quite a bit
- ☐ 5 Extremely
66. The next questions are about how you have felt during the past 4 weeks. For each question, please give the answer that comes closest to the way you have been feeling.

<table>
<thead>
<tr>
<th>How much of the time during the past 4 weeks...</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Did you feel full of life?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>b. Have you been very nervous?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c. Have your felt so down in the dumps that nothing could cheer you up?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d. Have you felt calm and peaceful?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e. Did you have a lot of energy?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>f. Have you felt downhearted and blue?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>g. Did you feel worn out?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>h. Have you been happy?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>i. Did you feel tired?</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

67. During the past 4 weeks how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
</table>

68. How TRUE or FALSE is each of the following statements is for you.

(Give your best guess. Mark one answer per row.)

<table>
<thead>
<tr>
<th>a. I seem to get sick a little easier than other people.</th>
<th>Definitely true</th>
<th>Mostly true</th>
<th>Not sure</th>
<th>Mostly false</th>
<th>Definitely false</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. I am as healthy as anybody I know.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. I expect my health to get worse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. My health is excellent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following questions are about smoking. Give your best guess. Mark one answer per row.

69. Have you smoked at least 100 cigarettes in your entire life? (100 cigarettes is approximately 5 packs)
   - No (Skip to Q72)
   - Yes
   - Don’t know

70. Do you now smoke cigarettes every day, some days, or not at all?
   - Every day (Skip to Q72)
   - Some days
   - Not at all
   - Don’t know

71. Have you EVER smoked cigarettes EVERY DAY for at least 6 months?
   - No
   - Yes
   - Don’t know

These next questions are about your sleep habits. Please mark one of the answers for each of the following questions. Pick the answer that best describes how often you experienced the situation in the past 4 weeks.

72. (Give your best guess. Mark one answer per row.)
   a. Did you have trouble falling asleep?
   - No, not in past 4 weeks.
   - Yes, less than once a week
   - Yes, 1 or 2 times a week
   - Yes, 3 or 4 times a week
   - Yes, 5 or more times a week

   b. Did you wake up several times at night?
   - No
   - Yes

   c. Did you wake up earlier than you planned to?
   - No
   - Yes

   d. Did you have trouble getting back to sleep after you woke up too early?
   - No
   - Yes

73. Overall, how was your typical night’s sleep during the past 4 weeks?
   - Very sound or restful
   - Sound or restful
   - Average quality
   - Restless
   - Very Restless

Please answer each item by marking one box per row. Give your best guess.

74. In the past 7 days...
   a. I felt fearful....
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

   b. I felt anxious....
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

   c. I felt worried....
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

   d. I found it hard to focus on anything other than my anxiety....
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always
These questions ask you about your feelings and thoughts during the last month. In each case, please indicate **how often** you felt or thought a certain way by checking the corresponding box. *(Give your best guess. Mark one answer per row.)*

<table>
<thead>
<tr>
<th></th>
<th>In the past 7 days...</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>e</td>
<td>I felt nervous....</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>f</td>
<td>I felt uneasy....</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>g</td>
<td>I felt tense....</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>75.</td>
<td>In the last month, how often have you been upset because of something that happened unexpectedly?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>76.</td>
<td>In the last month, how often have you felt that you were unable to control the important things in your life?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>77.</td>
<td>In the last month, how often have you felt nervous and “stressed”?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>78.</td>
<td>In the last month, how often have you felt confident about your ability to handle your personal problems?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>79.</td>
<td>In the last month, how often have you felt that things were going your way?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>80.</td>
<td>In the last month, how often have you found that you could not cope with all the things that you had to do?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>81.</td>
<td>In the last month, how often have you been able to control irritations in your life?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>82.</td>
<td>In the last month, how often have you felt that you were on top of things?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>83.</td>
<td>In the last month, how often have you been angered because of things that were outside of your control?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
<tr>
<td>84.</td>
<td>In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?</td>
<td>☐1</td>
<td>☐2</td>
<td>☐3</td>
<td>☐4</td>
<td>☐5</td>
</tr>
</tbody>
</table>
Below is a list of words that describe feelings that people have. Please read each word carefully. Then mark one answer that best describes HOW YOU HAVE BEEN FEELING IN THE LAST WEEK, INCLUDING TODAY. Please answer every item.

<table>
<thead>
<tr>
<th>How have you been feeling in the last week, including today?</th>
<th>Not at All</th>
<th>A Little</th>
<th>Moderately</th>
<th>Quite a Bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>85. Tense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>86. Angry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>87. Worn out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88. Lively</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>89. Confused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90. Shaky</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>91. Sad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92. Active</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93. Grouchy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>94. Energetic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95. Unworthy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>96. Uneasy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>97. Fatigued</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98. Annoyed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>99. Discouraged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100. Nervous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101. Lonely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>102. Muddled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>103. Exhausted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>104. Anxious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105. Gloomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>106. Sluggish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>107. Weary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>108. Bewildered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>109. Furious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110. Efficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>111. Full of Pep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>112. Bad-Tempered</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>113. Forgetful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>114. Vigorous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week. *(Give your best guess. Mark one answer per row.)*

<table>
<thead>
<tr>
<th>Question</th>
<th>Rarely or none of the time (less than 1 day)</th>
<th>Some or a little of the time (1-2 days)</th>
<th>Occasionally or a moderate amount of the time (3-4 days)</th>
<th>All of the time (5-7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>115. I was bothered by things that usually don't bother me….</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>116. I had trouble keeping my mind on what I was doing…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>117. I felt depressed…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>118. I felt that everything I did was an effort…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>119. I felt hopeful about the future…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>120. My sleep was restless…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>121. I was happy…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>122. I felt lonely…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>123. I could not &quot;get going&quot;…</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
**THESE NEXT QUESTIONS CONCERN YOUR ACCESS TO FOOD**

The following questions are about the ways you plan and fix foods for your family. As you read each question, think about the recent past. If you do not have children answer the questions for yourself.

*(Give your best guess. Mark one answer per row.)*

<table>
<thead>
<tr>
<th>Question</th>
<th>Do not do</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>124. How often do you plan meals ahead of time?</td>
<td>□ 4</td>
<td>□ 3</td>
<td>□ 2</td>
<td>□ 1</td>
<td>□ 0</td>
</tr>
<tr>
<td>125. How often do you compare prices before you buy food?</td>
<td>□ 4</td>
<td>□ 3</td>
<td>□ 2</td>
<td>□ 1</td>
<td>□ 0</td>
</tr>
<tr>
<td>126. How often do you run out of food before the end of the month?</td>
<td>□ 4</td>
<td>□ 3</td>
<td>□ 2</td>
<td>□ 1</td>
<td>□ 0</td>
</tr>
<tr>
<td>127. How often do you shop with a grocery list?</td>
<td>□ 4</td>
<td>□ 3</td>
<td>□ 2</td>
<td>□ 1</td>
<td>□ 0</td>
</tr>
<tr>
<td>128. When deciding what to feed your family, how often do you think about healthy food choices?</td>
<td>□ 4</td>
<td>□ 3</td>
<td>□ 2</td>
<td>□ 1</td>
<td>□ 0</td>
</tr>
<tr>
<td>129. How often do your children eat something in the morning within 2 hours of waking up?</td>
<td>□ 4</td>
<td>□ 3</td>
<td>□ 2</td>
<td>□ 1</td>
<td>□ 0</td>
</tr>
</tbody>
</table>

130. A number of programs are listed below that help supply food to individuals and households. Please mark all the programs that you and others in your household have used at some time in the last year. (Mark all that apply.)

- [ ] None
- [ ] Meals on Wheels
- [ ] Free or reduced cost meals for the elderly
- [ ] USDA or government commodity foods (requires you to fill out an eligibility form that you meet income, residence requirements)
- [ ] Food stamps, free or reduced cost school lunches, WIC (Women, Infant, and Children Feeding Program), or free or reduced-cost meals at day care or Head Start.
- [ ] Community Food Bank or Pantry or other free food or food vouchers
- [ ] Community meal program (soup kitchens, shelters, churches)
These next questions are about the food eaten in your household in the last 12 months and whether you were able to afford the food you need.

131. Which of these statements best describes the food eaten in your household in the last 12 months?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't know</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough of the kinds of food we wanted to eat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough but not always the kind of food we want</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes not enough to eat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Often not enough to eat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Go to Question 134

132. Here are some reasons why people don't always have the quality or variety of food they want. For each one, please tell us the reasons why YOU don’t always have the kind of food you want to eat. (Mark one answer per row.)

<table>
<thead>
<tr>
<th>Reason</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough money for food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinds of food (I/we) want not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough time for shopping or cooking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too hard to get to the store</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On a special diet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

133. Here are some reasons why people don’t always have enough to eat. For each one, please tell us the reasons why YOU don’t always have enough to eat. (Mark one answer per row.)

<table>
<thead>
<tr>
<th>Reason</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough money for food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough time for shopping or cooking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too hard to get to the store</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On a diet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No working stove available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not able to cook or eat because of health problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
These questions are in reference to food in your household. Mark if each statement was often true, sometimes true, or never true for your household in the last 12 months.

PART A: Questions 134-136

134. In the last 12 months, “We worried whether our food would run out before we got money to buy more.” (Give your best guess. Mark one answer.)

- [ ] Often true
- [ ] Sometimes true
- [ ] Never true

135. In the last 12 months, “The food that we bought just didn’t last, and we didn’t have money to get more.” (Give your best guess. Mark one answer.)

- [ ] Often true
- [ ] Sometimes true
- [ ] Never true

136. In the last 12 months, “We couldn’t afford to eat balanced meals.” (Give your best guess. Mark one answer.)

- [ ] Often true
- [ ] Sometimes true
- [ ] Never true

If Often true or Sometimes true to any question on PART A, answer PART B

If Never True to all questions on PART A, go to question 142
PART B: Questions 137-140

137. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Mark one answer.)

- No
- Yes

If yes, how often did this happen? (Give your best guess. Mark one answer.)

- Almost every month
- Some months but not every month
- Only 1 or 2 months

138. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food? (Mark one answer.)

- No
- Yes

139. In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food? (Mark one answer.)

- No
- Yes

140. In the last 12 months, did you lose weight because you didn't have enough money for food? (Mark one answer.)

- No
- Yes

If NO to all questions on PART B, go to question 142

If YES to any question on PART B, answer PART C

PART C: Question 141

141. In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Mark one answer.)

- No
- Yes

If yes, how often did this happen? (Give your best guess. Mark one answer.)

- Almost every month
- Some months but not every month
- Only 1 or 2 months
These next questions are about your food buying habits.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>142. I think vegetables are affordable to me in the store where I buy</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>143. Buying vegetables is difficult on my budget</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>144. I think fruit is affordable to me in the store where I buy most of</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>145. Buying fruit is difficult on my budget</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>146. Buying fast food is difficult on my budget</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>147. Lack of money prevents me from eating healthfully</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

These next questions are about your community

148. How many years have you lived in your community? (Give your best guess. Mark one answer.)

- – Less than one year
- – One to five years
- – Six to ten years
- – Eleven to twenty years
- – More than twenty years
- – All my life
- – Don’t know

149. Do you expect to be living in your community five years from now? (Mark one answer)

- – No
- – Yes
- – Don’t Know

150. Overall, how would you rate your community as a place to live? (Give your best guess. Mark one answer.)

- – Excellent
- – Good
- – Only fair
- – Poor
These questions are about what is available in your neighborhood.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>151. There are many places to go (e.g., stores, businesses, churches, parks) within easy walking distance (i.e. within 20 minutes) of my home.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
<tr>
<td>152. There are sidewalks on most of the streets in my neighborhood.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
<tr>
<td>153. There is a high crime rate in my neighborhood.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
<tr>
<td>154. The sidewalks in my neighborhood are well maintained (paved, even, and not a lot of cracks).</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
<tr>
<td>155. The majority of food available in my neighborhood is fast-food.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
<tr>
<td>156. There are many grocery stores and supermarkets in my neighborhood.</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
<tr>
<td>157. There are many places to exercise in my neighborhood (e.g., gyms, parks, fitness trails).</td>
<td>☐ 1</td>
<td>☐ 2</td>
<td>☐ 3</td>
<td>☐ 4</td>
</tr>
</tbody>
</table>

158. Think about the time you spend walking in your neighborhood. This includes walking for any purpose, such as recreation, exercise, or walking from place to place.

a) During the **last 7 days**, on how many days did you walk for at least 10 minutes at a time in your neighborhood? (Give your best guess. Write your answer in the box below.)

☐ ☐ No walking for more than 10 minutes at a time in my neighborhood. → Go to question 159

__________ days per week and _________ minutes per day

(example 3 days per week and 2 0 minutes per day)

b) On a **typical day** how many minutes do you walk in your neighborhood? (Give your best guess. Write your answer in the box below.)

_____ minutes per day
The following is a list of problems that could arise in any neighborhood. Please rate the extent to which each is a problem in your neighborhood by placing an X in the box corresponding to your answer.

(Give your best guess. Mark one answer.)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Not a problem</th>
<th>Some problem</th>
<th>Serious problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>159. Litter in the streets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>160. Smells and fumes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>161. Walking around after dark,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>162. Problems with dogs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>163. Noise from traffic or other homes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>164. Lack of entertainment (cafes, theaters)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>165. Traffic and road safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>166. Places to shop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>167. Vandalism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>168. Disturbance by neighbors or youngsters</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**THESE QUESTIONS CONCERN YOUR FAMILY AND RESOURCES**

169. How many times in the past 12 months have you volunteered (in your community, neighborhood, etc.)? (Give your best guess. Mark one answer.)

<table>
<thead>
<tr>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
</tr>
<tr>
<td>Once</td>
</tr>
<tr>
<td>A few times</td>
</tr>
<tr>
<td>2-4 times</td>
</tr>
<tr>
<td>5-9 times</td>
</tr>
<tr>
<td>About once a month</td>
</tr>
<tr>
<td>Twice a month</td>
</tr>
<tr>
<td>About once a week</td>
</tr>
<tr>
<td>More than once a week</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
</tbody>
</table>
170. Are you now helping at least one sick, limited, or frail family member or friend on a regular basis? (Mark one answer.)

- □ No
- □ Yes

If yes, in the past 4 weeks, how often have you helped this friend or family member? (Give your best guess. Mark one answer.)

- □ Less than once a week
- □ 1-2 times a week
- □ 3-4 times a week
- □ 5 or more times a week

The next questions are about your living and social activities.

171. Who lives with you? (Mark all that apply.)

- □ I live alone
- □ I live with my husband or partner
- □ I live with my children
- □ I live with my brother and/or sister
- □ I live with other relatives
- □ I live with friends
- □ Other (please describe): ________________

172. What is your current marital status? (Mark one answer that best describes you.)

- □ Never married
- □ Divorced or separated
- □ Widowed
- □ Presently married
- □ Living in a marriage-like relationship
173. **IF NOT MARRIED OR LIVING IN A MARRIAGE-LIKE RELATIONSHIP, SKIP TO QUESTION 176**

Which category below best describes the highest level of school your husband or partner completed? (Mark one answer.)

- □Didn't go to school
- □Grade school (1-4 years)
- □Grade school (5-8 years)
- □Some high school (9-11 years)
- □High school diploma or G.E.D.
- □Vocational or training school after high school graduation
- □Some college or Associate Degree
- □College graduate or Baccalaureate Degree
- □College or professional school after college graduation
- □Master's Degree
- □Doctoral Degree (Ph.D., M.D., J.D., etc)

174. **What is your husband’s or partner’s current job status? (Mark all that apply.)**

- □Not working
- □Retired
- □Homemaker, raising children, care of others
- □Employed (full-time or part-time)
- □Disabled, unable to work
- □Other (Specify) __________________________________________
175. Which statement below best describes your husband’s or partner’s job? If not working now, which one best describes your partner’s last job? (Mark one answer.)

<table>
<thead>
<tr>
<th>Homemaker, raising children, care of others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine operator For example: meter reader, installer, truck driver, etc</td>
</tr>
<tr>
<td>Manual labor For example: maintenance worker, construction work, warehouse worker, utility worker, material handler, etc</td>
</tr>
<tr>
<td>Skill or craft For example: building trades, hourly paid supervisor, line worker, technician, mechanic, repairer, etc</td>
</tr>
<tr>
<td>Scientific technical work For example: computer programmer, dental assistant, vocational/practical nurse, computer operator, engineering aide, lab technician, etc</td>
</tr>
<tr>
<td>Service work For example: firefighter, security worker, custodian/maid, cook, waitress/waiter, seamstress/tailor, farmer, forestry or fishing occupations, cafeteria worker, store clerk, gas attention attendant, etc</td>
</tr>
<tr>
<td>Clerical, office or sales work For example: billing, customer service, receptionist, cashier, telephone operator, administrative support, typist, travel agent, bank teller, etc</td>
</tr>
<tr>
<td>Professional, managerial or administrative work For example: engineer, teacher, registered nurse, lawyer, accountant, salaried manager, personnel worker, etc</td>
</tr>
<tr>
<td>Other (specify) ____________________________________________</td>
</tr>
</tbody>
</table>

176. What was the total family income (before taxes) from all sources within your household (including paychecks, social security, retirement income, and public assistance) in the last year? (Mark the one that is your best guess.)

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $7,000</td>
<td>1</td>
</tr>
<tr>
<td>$7,000 to $9,999</td>
<td>2</td>
</tr>
<tr>
<td>$10,000 to $11,999</td>
<td>3</td>
</tr>
<tr>
<td>$12,000 to $15,999</td>
<td>4</td>
</tr>
<tr>
<td>$16,000 to $19,999</td>
<td>5</td>
</tr>
<tr>
<td>$20,000 to $24,999</td>
<td>6</td>
</tr>
<tr>
<td>$25,000 to $29,999</td>
<td>7</td>
</tr>
<tr>
<td>$30,000 to $34,999</td>
<td>8</td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>9</td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>10</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>11</td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>12</td>
</tr>
<tr>
<td>$150,000 or more</td>
<td>13</td>
</tr>
<tr>
<td>Don’t know</td>
<td>14</td>
</tr>
</tbody>
</table>
177. All together, what is your current total family savings, assets, retirement and pensions plans, and property from all sources within your household? (Include the total value of your home and car(s) minus the amounts still owed.) *(Give your best guess. Mark one answer.)*

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 1</td>
<td>Less than $500</td>
<td>□ 10</td>
</tr>
<tr>
<td>□ 2</td>
<td>$500 to $4,999</td>
<td>□ 21</td>
</tr>
<tr>
<td>□ 3</td>
<td>$5,000 to $9,999</td>
<td>□ 31</td>
</tr>
<tr>
<td>□ 4</td>
<td>$10,000 to $24,999</td>
<td>□ 41</td>
</tr>
<tr>
<td>□ 5</td>
<td>$25,000 to $49,999</td>
<td>□ 51</td>
</tr>
</tbody>
</table>

178. What is the total family debt within your household from such things as credit card charges, medical or legal bills, and loans from banks or relatives? (Do not include mortgage or car loans) *(Give your best guess. Mark one answer.)*

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 6</td>
<td>Less than $2,000</td>
<td>□ 61</td>
</tr>
<tr>
<td>□ 7</td>
<td>$2,000 to $4,999</td>
<td>□ 71</td>
</tr>
<tr>
<td>□ 8</td>
<td>$5,000 to $9,999</td>
<td>□ 81</td>
</tr>
<tr>
<td>□ 9</td>
<td>$10,000 to $19,999</td>
<td>□ 91</td>
</tr>
</tbody>
</table>

179. Do you currently have health insurance? This includes pre-paid private insurance such as Health Maintenance Organization (HMO), other private insurance, Medicare, Medicaid, (including State Medical Assistance or Medi-Cal), or Military or Veterans Administration health care coverage? *(Mark one answer.)*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 10</td>
<td>No</td>
</tr>
<tr>
<td>□ 11</td>
<td>Yes</td>
</tr>
</tbody>
</table>

If yes, which of the following best describes the doctors and hospitals covered by your current health insurance? *(Give your best guess. Mark one answer.)*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 12</td>
<td>Benefits are the same for any doctor or hospital I choose</td>
</tr>
<tr>
<td>□ 13</td>
<td>I can use any doctor or hospital, but I must pay more for those not on a list (or identified with my plan)</td>
</tr>
<tr>
<td>□ 14</td>
<td>For my bills to be covered, I must use only the doctors and hospitals on a list (or identified with the plan)</td>
</tr>
</tbody>
</table>
180. How many people, including yourself, live in your household as members of your family (whom you support or who contribute to supporting your family)? *(Mark one answer.)*

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>One</td>
<td>Two</td>
<td>Three</td>
<td>Four</td>
<td>Five or more</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

a How many of these people are under 18 years old? *(Give your best guess. Mark one answer.)*

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>One</td>
<td>Two</td>
<td>Three</td>
<td>Four</td>
<td>Five or more</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

b How many are between 18 and 64 years old (including yourself)? *(Give your best guess. Mark one answer.)*

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>One</td>
<td>Two</td>
<td>Three</td>
<td>Four</td>
<td>Five or more</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

c How many are 65 years or older? *(Give your best guess. Mark one answer.)*

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>One</td>
<td>Two</td>
<td>Three</td>
<td>Four</td>
<td>Five or more</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

181. What is the highest degree or level of school you have completed? Mark one box. If currently enrolled, mark the previous grade or highest degree received.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>NO SCHOOLING COMPLETED</td>
<td>NURSERY SCHOOL OR 4th GRADE</td>
<td>HIGH SCHOOL GRADUATE — HIGH SCHOOL DIPLOMA OR THE EQUIVALENT (FOR EXAMPLE GED)</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5th GRADE OR 6th GRADE</td>
<td>7th GRADE OR 8th GRADE</td>
<td>ASSOCIATES DEGREE (FOR EXAMPLE: AA, AS)</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>9th GRADE</td>
<td>10th GRADE</td>
<td>BACHELOR’S DEGREE (FOR EXAMPLE: BA, AB, BS)</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>11th GRADE</td>
<td>12th GRADE, NO DIPLOMA</td>
<td>MASTER’S DEGREE (FOR EXAMPLE: MA, MS, MENG, MED, MSW, MBA)</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>12th GRADE</td>
<td>13th GRADE</td>
<td>PROFESSIONAL DEGREE (FOR EXAMPLE: MD, DDS, DVM, LLB, JD)</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>13th GRADE</td>
<td>14th GRADE</td>
<td>DOCTORATE DEGREE (FOR EXAMPLE: PHD, EdD)</td>
</tr>
</tbody>
</table>
182. What is your current job status? (Mark the one that best describes you. If more than one describes you, mark both.)

<table>
<thead>
<tr>
<th>Choice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NOT WORKING</td>
</tr>
<tr>
<td>2</td>
<td>RETIRED</td>
</tr>
<tr>
<td>3</td>
<td>HOMEMAKER, RAISING CHILDREN, CARE OF OTHERS</td>
</tr>
<tr>
<td>4</td>
<td>EMPLOYED (FULL-TIME OR PART-TIME)</td>
</tr>
<tr>
<td>5</td>
<td>DISABLED, UNABLE TO WORK</td>
</tr>
<tr>
<td>6</td>
<td>OTHER (SPECIFY) ___________________________</td>
</tr>
</tbody>
</table>

183. Which of the statements below best describe your job? If you are not working now, which statement best describes the job you held the longest? (If you are a homemaker, but work part-time, you should mark both.)

<table>
<thead>
<tr>
<th>Choice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HOMEMAKER, RAISING CHILDREN, CARE OF OTHERS</td>
</tr>
</tbody>
</table>
| 2      | MACHINE OPERATOR  
For example: meter reader, installer, truck driver, etc. |
| 3      | MANUAL LABOR  
For example: maintenance worker, construction work, warehouse worker, utility worker, material handler, gardener, etc. |
| 4      | SKILL OR CRAFT  
For example: building trades, hourly paid supervisor, line worker, technician, mechanic, repairer, etc. |
| 5      | SCIENTIFIC TECHNICAL WORK  
For example: computer programmer, dental assistant, vocational/practical nurse, computer operator, engineering aide, lab technician, etc. |
| 6      | SERVICE WORK  
For example: firefighter, security worker, custodian, maid, cook, waitress, seamstress, farmer, forestry or fishing occupations, cafeteria worker, etc. |
| 7      | CLERICAL, OFFICE OR SALES WORK  
For example: billing, customer service, receptionist, cashier, telephone operator, administrative support, typist, etc. |
| 8      | PROFESSIONAL, MANAGERIAL OR ADMINISTRATIVE WORK  
For example: engineer, teacher, registered nurse, lawyer, accountant, salaried manager, personnel worker, etc. |
| 9      | OTHER (SPECIFY) ___________________________ |

33
Now we are going to ask you about your father's (or the male head of the household's) education while you were growing up.

184. Which category below best describes the highest level of school your father (or the male head of the household) completed? *(Mark one answer.)*

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Didn't go to school</td>
</tr>
<tr>
<td>2</td>
<td>Grade school (1-4 years)</td>
</tr>
<tr>
<td>3</td>
<td>Grade school (5-8 years)</td>
</tr>
<tr>
<td>4</td>
<td>Some high school (9-11 years)</td>
</tr>
<tr>
<td>5</td>
<td>High school diploma or G.E.D.</td>
</tr>
<tr>
<td>6</td>
<td>Vocational or training school after high school graduation</td>
</tr>
<tr>
<td>7</td>
<td>Some college or Associate Degree</td>
</tr>
<tr>
<td>8</td>
<td>College graduate or Baccalaureate Degree</td>
</tr>
<tr>
<td>9</td>
<td>College or professional school after college graduation</td>
</tr>
<tr>
<td>10</td>
<td>Master's Degree</td>
</tr>
<tr>
<td>11</td>
<td>Doctoral Degree (Ph.D., M.D., J.D., etc)</td>
</tr>
<tr>
<td>12</td>
<td>Do not know</td>
</tr>
</tbody>
</table>

185. What was your father's (or male head of the household's) job status while you were growing up? *(If more than one applies, mark both.)*

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Did not work</td>
</tr>
<tr>
<td>2</td>
<td>Retired</td>
</tr>
<tr>
<td>3</td>
<td>Homemaker, raising children, care of others</td>
</tr>
<tr>
<td>4</td>
<td>Employed (Full-time or part-time)</td>
</tr>
<tr>
<td>5</td>
<td>Disabled, unable to work</td>
</tr>
<tr>
<td>6</td>
<td>Other (specify)</td>
</tr>
<tr>
<td>7</td>
<td>Do not know</td>
</tr>
</tbody>
</table>
186. Which statement below best describes your father's (or male head of the household's) job while growing up? Choose the one single category that represents the job he held the longest.

- Homemaker, Raising Children, Care of Others
- Machine Operator: For example: meter reader, installer, truck driver, etc.
- Manual Labor: For example: maintenance worker, construction work, warehouse worker, utility worker, material handler, etc.
- Skill or Craft: For example: building trades, hourly paid supervisor, line worker, technician, mechanic, repairer, etc.
- Scientific Technical Work: For example: computer programmer, dental assistant, vocational/practical nurse, computer operator, engineering aide, lab technician, etc.
- Service Work: For example: firefighter, security worker, custodian, cook, waiter, tailor, farmer, forestry or fishing occupations, cafeteria worker, etc.
- Clerical, Office or Sales Work: For example: billing, customer service, receptionist, cashier, telephone operator, administrative support, typist, etc.
- Professional Managerial or Administrative Work: For example: engineer, teacher, registered nurse, lawyer, accountant, salaried manager, personnel worker, etc.
- Other (Specify)
- Do not know

Now we are going to ask you about your mother's education while you were growing up.

187. Which category below best describes the highest level of school your mother (or the female head of the household) completed? (Mark one answer.)

- Didn't go to school
- Grade school (1-4 years)
- Grade school (5-8 years)
- Some high school (9-11 years)
- High school diploma or G.E.D.
- Vocational or training school after high school graduation
- Some college or Associate Degree
- College graduate or Baccalaureate Degree
- College or professional school after college graduation
- Master's Degree
- Doctoral Degree (Ph.D., M.D., J.D., etc)
- Do not know
188. What was your mother’s (or female head of the household’s) job status while you were growing up? (If more than one applies, mark both.)

- Did not work
- Retired
- Homemaker, raising children, care of others
- Employed (Full-time or part-time)
- Disabled, unable to work
- Other (specify) __________________________
- Do not know

189. Which statement below best describes your mother’s (or female head of the household) job while growing up? Choose the one single category that represents the job he held the longest.

- HOMEMAKER, RAISING CHILDREN, CARE OF OTHERS
- MACHINE OPERATOR: For example: meter reader, installer, truck driver, etc.
- MANUAL LABOR: For example: maintenance worker, construction work, warehouse worker, utility worker, material handler, etc.
- SKILL OR CRAFT: For example: building trades, hourly paid supervisor, line worker, technician, mechanic, repairer, etc.
- SCIENTIFIC TECHNICAL WORK: For example: computer programmer, dental assistant, vocational/practical nurse, computer operator, engineering aide, lab technician, etc.
- SERVICE WORK: For example: firefighter, security worker, custodian, maid, cook, waitress, seamstress, farmer, forestry or fishing occupations, cafeteria worker, etc.
- CLERICAL, OFFICE OR SALES WORK: For example: billing, customer service, receptionist, cashier, telephone operator, administrative support, typist, etc.
- PROFESSIONAL, MANAGERIAL OR ADMINISTRATIVE WORK: For example: engineer, teacher, registered nurse, lawyer, accountant, salaried manager, personnel worker, etc.
- OTHER (SPECIFY) __________________________
- DO NOT KNOW
Think of this ladder as representing where people stand in the United States.

At the top of the ladder are the people who are the best off — those who have the most money, the most education and the most respected jobs. At the bottom are the people who are the worst off — who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

Where would you place yourself on this ladder?

Please place a large “X” on the rung where you think you stand at this time in your life, relative to other people in the United States.
191. Suppose you (and your spouse or partner) sell everything you own (cars, houses, land, retirement/pension funds, etc.) and you use the money to pay all your debts (credit cards, mortgage, etc.) Would you still have any money left over after paying your debts? (Mark one answer.)

- Would still have money left over □
- Would still owe money □
- Debts would just about equal assets □
- Don't owe/own anything □

192. How much money would you have left over? (Give best guess. Write your answer.)

$_______

193. In general, would you say (you have, your family living here has) more money than you need, just enough for your needs, or not enough to meet your needs? (Give best guess. Mark one answer.)

- Not enough □
- Just enough □
- More than enough □

THE FOLLOWING QUESTIONS WILL HELP US UNDERSTAND MORE ABOUT OUR PARTICIPANTS

194. What is your date of birth? (Write your answer.)

Month /Day/Year

195. How tall are you? (Write your answer below.)

_______ Feet _______ Inches

OR

_______ Meters

196. How much do you weigh? (Write your answer below.)

_______ Pounds

OR

_______ Kilograms
197. a. What is the most you have ever weighed, not counting pregnancies? *(Write your answer below.)*

___ ___ Pounds OR ___ ___ Kilograms

b. How old were you when you weighed that much? *(Write your answer below.)*

___ ___ Years old

198. How many times in your life would you guess you have lost the amount of weight shown below, not counting pregnancies? *(Write your answers below.)*

<table>
<thead>
<tr>
<th>5-9 pounds (2 - &lt;5 kg)</th>
<th>10-19 pounds (5 - &lt;9 kg)</th>
<th>20-49 pounds (9 - &lt;22 kg)</th>
<th>50-79 pounds (22 - &lt;36 kg)</th>
<th>80-99 pounds (36 - 45 kg)</th>
<th>&gt;100 pounds (&gt;45 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ times</td>
<td>___ times</td>
<td>___ times</td>
<td>___ times</td>
<td>___ times</td>
<td>___ times</td>
</tr>
</tbody>
</table>

The following questions are about your reproductive history.

199. Have you ever been pregnant? *(Mark one answer.)*

- [ ] No
- [ ] Yes
- [ ] Not Sure

If NO, skip to Q.203

200. Are you currently pregnant? *(Mark one answer.)*

- [ ] No
- [ ] Yes
- [ ] Not Sure

201. Altogether, how many times have you been pregnant in the past (including live births, still births, miscarriages and abortions)? *(Write your answer below.)*

___ pregnancies
202. Please tell us about each of your pregnancies, beginning with your first.

<table>
<thead>
<tr>
<th></th>
<th>1st Pregnancy</th>
<th>2nd Pregnancy</th>
<th>3rd Pregnancy</th>
<th>4th Pregnancy</th>
<th>5th Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. How many weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pregnant were you</td>
<td>weeks</td>
<td>weeks</td>
<td>weeks</td>
<td>weeks</td>
<td>weeks</td>
</tr>
<tr>
<td>when the pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ended? (Write your</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>answers for each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pregnancy in spaces</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>to left.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Did this</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>pregnancy result in</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>a live-born baby?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Mark one answer for</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>each pregnancy.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>c. Did you breast</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>feed? (Mark one</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>answer for each</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pregnancy.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next questions are about menstruation.

203. At what age did you have your first menstrual period?
(Please give your best guess.):

______ years old

204. Have you gone through
menopause or the change of
life? (Mark one answer.)

☐ No ☐ Yes ☐ Not sure

Skip to Q.207

205. If yes, how did your periods
stop? (Mark one answer.)

☐ Naturally ☐ By surgery ☐ Other (please specify):

206. How old were you when this occurred? (Write your
answer.)

______ years old
The next questions are about your ethnicity and race.

207. Are you of Hispanic origin such as Mexican American, Latin American, Puerto Rican or Cuban? *(Mark one answer.)*

- [ ] No
- [x] Yes

208. What is your race? *(Mark one answer.)*

- [ ] White
- [x] Black or African American
- [x] Asian
- [ ] Hawaiian or Pacific Islander
- [ ] American Indian, Native American, or Alaskan Native
- [ ] Other (specify) ________________

209. What language would you say you speak most of the time? *(Mark one answer.)*

- [x] English
- [ ] Spanish
- [ ] Other (Specify) ________________
- [ ] Don't know

210. What language do you mostly think in? *(Mark one answer.)*

- [ ] English
- [ ] Spanish
- [ ] About the same in Spanish and English
- [ ] Mostly in another language
- [ ] About the same in English and another language
- [ ] Don't know
211. Of the following, how do you most identify yourself? *(Mark one answer.)*

- [ ] American
- [ ] Anglo American
- [ ] Chicano
- [ ] Mexican
- [ ] Mexican American
- [ ] Spanish American
- [ ] Other *(Specify):__________________________
- [ ] Don't know

212. Where were you born? *(Mark one answer.)*

- [ ] U. S.
- [ ] Mexico
- [ ] Other *(Please specify):__________________________
We will need to contact you in the near future in case we have some questions about your survey or to invite you to contribute additional information.

213. Are you OK with giving us phone numbers where so can reach you?

☐ NO  ☐ YES

If yes, please provide your phone number and the best time to call.

1. HOME PHONE (_____) _______ - _________
2. WORK PHONE (_____) _______ - _________ hours ___to____
3. CELL PHONE (_____) _______ - _________
4. BEST 2 TIMES TO CALL: ___________________ and ___________________
5. Best number to call ___________________
6. Address: Please print legibly:
7. Street _________________________________
8. PO Box ________________________________
9. City ___________________ State ________ Zip ______

THANK YOU FOR YOUR TIME TODAY!
VITA

Stephanie Whisnant Cash was born in Virginia. In 2007, she graduated from Emory University in Atlanta, Georgia with a Bachelor of Arts in Psychology. In 2009, she earned her Master in Public Health from the Department of Epidemiology at the University of Washington in Seattle. Stephanie has diverse experience in public health and epidemiology, from developing a toolkit on integrated child health campaign implementation, to pandemic flu preparedness in Thailand, to academic research in obesity, physical activity, cancer prevention, and quality of life. She conducted her dissertation research at the University of Washington (Seattle, WA), the Fred Hutchinson Cancer Research Center (Seattle, WA), and the City of Hope Beckman Research Institute (Southern California). Stephanie earned her Doctor of Philosophy in Epidemiology from the University of Washington in 2012.