Retirement and Weight Changes Among Men and Women in the Health and Retirement Study

Valerie L. Forman-Hoffman, 1,2,3 Kelly K. Richardson, 1 Jon W. Yankey, 4
Stephen L. Hillis, 1,4 Robert B. Wallace, 3 and Fredric D. Wolinsky 1,2,5

1Center for Research in the Implementation of Innovative Strategies in Practice, Iowa City Veteran’s Affairs Medical Center, Iowa City, IA.
Departments of 2Internal Medicine,
3Epidemiology,
4Biostatistics, and
5Health Management and Policy, University of Iowa, Iowa City.

Objectives. Older adults may experience weight changes upon retirement for a number of reasons, such as being less physically active; having less structured meal times; and consuming food in response to losing personal identity, the potential for social interactions, or the sense of accomplishment derived from working. The purpose of this study was to determine whether retirement was associated with either weight gain or weight loss.

Methods. We used the 1994–2002 Health and Retirement Study to determine whether retirement between biennial interviews was associated with weight change, separately for men (n = 1,966) and women (n = 1,759). We defined weight change as a 5% increase or decrease in body mass index between interviews.

Results. We did not find a significant association between retirement and weight change among men. Women who retired were more likely to gain weight than women who continued to work at least 20 hr per week (odds ratio [OR] = 1.24, 95% confidence interval [CI] = 1.04–1.48). We found a significant relationship between retirement and weight gain only for women who were normal weight upon retiring (OR = 1.30, 95% CI = 1.01–1.69) and who retired from blue-collar jobs (OR = 1.58, 95% CI = 1.13–2.21).

Discussion. Public health interventions may be indicated for women, particularly those working in blue-collar occupations, in order to prevent weight gain upon retirement.

Key Words: Weight—Retirement—Longitudinal research—Aging.

Obesity is a growing national health crisis in the United States among individuals of all ages (Hedley et al., 2004; Ogden et al., 2006). Data from the 2003 Behavioral Risk Factor Surveillance System indicate that, among adults aged 65 years old and older, nearly 60% are overweight or obese (Li, Fisher, & Harmer, 2005). This is particularly troubling given that obesity has been identified in the causal pathway as well as a source of exacerbation of several health conditions such as arthritis, diabetes, and heart disease (Field et al., 2001; Mokdad et al., 1999; Must et al., 1999; Patterson, Frank, Kristal, & White, 2004).

One common life event in older adults that may affect weight change and lead to obesity is retirement. Retirees may experience weight changes for several reasons. First, retirees may gain weight as a result of being less physically active than when they were working, coupled with the normal weight gain that adults tend to show after age 50 due to decreasing muscle mass and decreased basal metabolism (Weyer, Snitker, Rising, Bogardus, & Ravussin, 1999). For example, Patrick, Bassey, and Fentem (1982) found that body fat increased by 3% and body muscle decreased 1% in the period just prior to retirement and 1 year postretirement among men retiring from manual work. And in a separate study, female factory workers showed a significant decrease in physical activity 1 year after retirement (Patrick, Bassey, Irving, Blecher, & Fentem, 1986). Second, retirees may lose weight as a result of reduced episodes of work-related eating out, because several previous studies have linked eating away from home, particularly at fast food restaurants, to weight gain (Bowman & Vinyard, 2004; French, Hamack, & Jeffery, 2000; McCrory et al., 1999; Mokdad et al., 1999; Pereira et al., 2005; Prentice & Jebb, 2003). This decrease in eating out, which has been evidenced in a previous investigation (Chung, Popkin, Domino, & Stearns, 2007), may also be due to retirees having more time for food preparation and greater budgetary constraints following retirement (Chung et al., 2007). Thus, retirement might cause behavioral changes that influence either food intake, physical activity, or both and that subsequently affect weight change.

Additional reasons why individuals may lose or gain weight upon retiring may derive from a theoretical classification of work posed by Friedmann and Havighurst (1954). They proposed that work is (a) a source of income, (b) a routine structuring of the use of time, (c) a source of personal status and identity, (d) a place enabling social interactions, and (e) an experience providing a sense of accomplishment. Thus, the loss of structured time during work may enable retirees to snack more in between meal times. Retirement may also reduce personal identity, the potential for social interactions, and the sense of accomplishment derived from working, which may cause retirees to gain (or lose) weight, especially if eating (or not eating) is a reaction to feelings of inadequacy, depression, or isolation. Alternatively, individuals working in stressful or
demanding jobs may experience increases in mood and well-being upon retirement, possibly leading to weight changes if these feelings are expressed through appetite and food consumption changes.

More recent studies of retirement have not fully supported Friedmann and Havighurst’s activity theory or the closely related role theory developed by Parsons (1942) back in the 1940s. For example, the British Whitehall II study found that recent civil servant retirees cultivated hobbies after retirement that fulfilled new role expectations (Mein, Higgs, Ferrie, & Stansfeld, 1998). In the Whitehall II study, however, women retirees acknowledged that they had an ongoing need for recognition and fulfillment that was not being met by the activities substituted for their retired jobs. The men interviewed during the Whitehall II study did not express the same sentiments. It is not uncommon for men and women to experience retirement in different ways. Riley (1988) described aging as a dynamic process during which individuals constantly change their roles depending on their unique needs as well as the social and economic factors surrounding their situations. Building upon this evidence, it is possible that this continuing unmet need for recognition and respect by women may be expressed through eating and, subsequently, weight gain.

The purpose of this study was to determine whether retirement was associated with either weight gain or weight loss in a large, nationally representative sample of older men and women. We hypothesized that retirement would be accompanied by weight gain for both men and women, but that the effects may not be the same in analyses stratified by type of work or starting weight category. We hypothesized that individuals who retired at a normal weight and who retired from a blue-collar occupation would be more likely to gain weight upon retirement.

**METHODS**

**Data Source**

We used data from the Health and Retirement Study (HRS), which is sponsored by the National Institute on Aging. HRS is a nationally representative longitudinal study that was initiated in 1992. The sampling frame consisted of a multistage, area probability design of respondents in U.S. households, with special provisions to oversample African Americans, Hispanics, and Florida residents. Each selected household was contacted by telephone and screened for an age-eligible respondent who was born between 1931 and 1941. Spouses and partners of the age-eligible person were eligible to participate as well, regardless of year of birth.

In 1992, the HRS conducted in-home interviews in 7,702 households, representing an 82.0% response rate. This yielded 9,824 participants between 51 and 61 years old for initial face-to-face interviews in 1992. Follow-up telephone interviews were conducted every 2 years and are available for 1994, 1996, 1998, 2000, and 2002. We used the information collected in these five telephone interviews as the basis for our investigation. Although the HRS includes the spouse or partner of age-eligible persons, these analyses included only respondents born between 1931 and 1941. Our sampling frame included all respondents born between 1931 and 1941 who participated in at least one telephone interview in 1994, 1996, 1998, 2000, or 2002. Our sample, therefore, comprised 4,815 men and 5,335 women aged 53 to 63 in 1994 followed through 2002, when they were 61 to 71 years old. We acquired all data using the publicly available files (Technical description, 1995).

**Measurement of Focal Variables**

**Dependent variable: Weight.**—Each respondent self-reported weight and height at each interview. Body mass index (BMI) was calculated for each interview using the following formula: weight (kg)/height (m²). Changes in BMI were calculated for each biennial period between 1994 and 2002. Weight changes were expressed as percent change in BMI, which research has shown to be the most clinically relevant measure (Roubenoff & Kehayias, 1991). Because height did not change significantly during the study period, we use the term weight instead of BMI to ease interpretation, as changes in BMI over time could only be attributed to weight change and not change in height (which was minimal between study waves). We trichotomized the percent change in weight (BMI) between adjacent interviews into having at least a 5% decline in weight from the previous time point (weight loss), having at least a 5% increase in weight from the previous time point (weight gain), and not having a significant change in weight from the previous time point (no change: −5% < weight change < 5%). The no-change group was the reference group in the analyses. We trichotomized weight change because both weight loss and weight gain have been associated with retirement in previous studies. Therefore, we thought it would be important to determine whether retirement may be linked to either weight loss or weight gain. We chose a 5% reduction in weight as a clinically meaningful outcome because previous studies have found that 5% and smaller reductions in weight can lead to significant health benefits (Blackburn, 1995; Foster et al., 2004).

To adjust for weight at the beginning of each time period, we categorized BMI into obese (BMI = 30+) overweight (25 ≤ BMI < 30), or normal weight (BMI < 25) and incorporated this variable into the multivariate analyses. We also conducted stratified analyses to determine whether retirement predicted weight changes in men and women who were overweight/obese at the beginning of a time period, and again in men and women who were normal weight at the beginning of a time period. We hypothesized that the relationship between retirement and weight changes may differ among normal/underweight individuals and overweight/obese individuals.

**Independent variable: Retirement status.**—We conducted our analyses only on individuals currently working at the beginning of an assessment period. We defined this at each assessment point as the respondent reporting currently working at least 20 hr per week, which is a standard approach given that many employers require an employee to work at least 20 hr per month to receive full-time staff benefits. We categorized a respondent as “continuing to work” if, for a given 2-year period (e.g., 1994–1996), he or she reported to currently work at least 20 hr per week at both adjacent assessment points. We categorized a respondent as “recently retired” if he or she reported currently working at the time of the first interview but reported retiring in the previous 2 years at the time of the next biennial interview. For example, we categorized a person...
reporting currently working at least 20 hr per week in 1994 who reported retiring in 1995 at the 1996 interview as recently retired for the 1994–1996 interval. Our analyses compared recent retirees, or respondents who reported retiring during the 2-year period in between assessment points, to people who continued to work at both adjacent assessment points. For example, for the 1994–1996 period, we compared respondents currently working at least 20 hr per week in both 1994 and 1996 with respondents currently working at least 20 hr per week in 1994 who reported retiring between 1994 and 1996 at the 1996 assessment.

Each analysis also adjusted for type of work, categorized into “white collar,” “blue collar,” and “other/farmer/military.” White-collar occupations consisted of managerial specialty operation, professional specialty operation/technical support, sales, clerical/administrative support, and health services jobs. Blue-collar occupations consisted of service, mechanics and repair, construction trade and extracting, precision production, and operator jobs. The residual category of occupation (other/farmer/military) consisted of farming/forestry/fishing jobs as well as jobs in the armed forces. We conducted further analyses stratified by type of work to examine whether retirement predicted weight changes in each of the three categories for both men and women. Because there were few other/farmer/military women (n = 4), we did not model the effect of retirement on weight changes for these individuals. We hypothesized that perhaps individuals employed in blue-collar occupations would be more susceptible to weight gain upon retirement, given the reduction in physical activity at work.

Measurement of Covariates

We adjusted our multivariate models for covariates that are known to impact weight change. For example, previous research has shown that depressive symptoms (Friedman & Brownell, 1995; Johnston, Johnson, McLeod, & Johnston, 2004); functional status (Jenkins, 2004; Zoico et al., 2004); medical comorbidities (Folsom, French, Zheng, Baxter, & Jeffery, 1996; Harris, Launer, Madans, & Feldman, 1997); health behaviors such as smoking, drinking, and physical activity; and demographics such as age, gender, race/ethnicity, and marital status (Valdez & Williamson, 2002) can affect weight and changes in weight. We adjusted all multivariate models for each of these variables as described below.

Demographics.—Respondents self-reported age, gender, race/ethnicity, marital status, and education level. Age was assessed as a continuous variable. Race/ethnicity was categorized into White/Caucasian, Black or African American, Hispanic (non-Black), and other. Marital status was categorized as married versus not currently married. Educational levels were grouped from 0 to 11 years, high school graduate, some college, college graduate, and post college.

Health and behaviors.—The HRS included questions about the number of self-reported chronic health problems (have/don’t have; 1/0) as diagnosed by a doctor, including hypertension, cancer, diabetes, pulmonary disease, heart disease, stroke, psychological problems, and/or arthritis. Following Ferraro and Wilmoth (2000), we summed these to form a comorbidity measure (range = 0–8). Based on the distribution, we trichotomized this variable into 0 versus 1 versus 2 or more medical conditions at each assessment point. Other behavioral variables of interest that were evaluated included physical activity, smoking history, and alcohol use. We dichotomized physical activity into participating in a form of vigorous physical activity (e.g., heavy housework, aerobics, running, swimming, or bicycling) 3 times per week or more versus less than 3 times per week. We dichotomized cigarette smoking as current smoker versus current nonsmoker. We dichotomized alcohol use as heavy drinking (3 or more alcoholic drinks per day) versus otherwise. We calculated all variables at each assessment point.

Functional status.—The HRS also included several yes/no (1/0) measures of functional limitations. We calculated a summed functional limitations score (range = 0–8) by adding the responses to each of the eight items: difficulty sitting for 2 hr or more, stooping/kneeling/crouching, lifting or carrying an object weighing 10 lbs, picking up a dime from a table, lifting arms above shoulder level, walking several blocks, walking one block, and climbing one flight of stairs. Based on the distribution, we dichotomized this variable into 0 versus 1 or more functional limitations at each assessment point.

Depressive symptoms.—Depressive symptoms were measured using the sum of eight yes/no (1/0) items from the Center for Epidemiologic Studies–Depression scale (CES-D) at each interview (range = 0–8). This instrument measures a continuum of psychological distress (symptoms of depression and anxiety) rather than determining the presence or absence of recognized psychiatric disorders. Higher scores are indicative of more psychological distress. A complete description of this scale may be found elsewhere (Radloff, 1977). To decrease response burden, the HRS selected eight CES-D items to administer to each respondent at each study wave (depressed mood, sadness, happiness, ability to enjoy life, feeling lonely, ability to “get going,” restless sleep, feeling like everything is “an effort”). Cronbach’s alphas for the CES-D were greater than .80 in all years.

Data Analysis

We used information collected between each sequential pair of biennial interviews to construct our models describing the relationship between recent retirement and weight change (5% gain or loss). For example, we used retirement between the 1994 and 1996 interviews as a predictor of change in weight during the same time period. Each respondent had the ability to contribute up to four sequential pairs of observations (1994–1996, 1996–1998, 1998–2000, and 2000–2002). We calculated change in weight and trichotomized it into gained weight (5%+), no change in weight, and lost weight (5%+), as previously described. We used multinomial logistic regression because we had three categories of weight change. No weight change served as the reference category.

We fit our models separately for men and women to allow the retirement–weight change relationship to differ by gender. Multivariable models adjusted for baseline values of each covariate at the beginning of each sequential pair of biennial interviews. These covariates included the demographic variables, health and behaviors, functional limitations, depressive
Table 1. Characteristics of Participants in the Health and Retirement Study, 1994–2002, by Gender

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Men (n = 4,815)</th>
<th>Women (n = 5,335)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/partnered</td>
<td>72.5</td>
<td>60.1</td>
</tr>
<tr>
<td>Divorced/separated</td>
<td>9.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Widowed</td>
<td>2.2</td>
<td>11.4</td>
</tr>
<tr>
<td>Never married</td>
<td>3.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Missing</td>
<td>13.3</td>
<td>10.1</td>
</tr>
<tr>
<td>Education, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–11 years</td>
<td>28.1</td>
<td>29.2</td>
</tr>
<tr>
<td>High school</td>
<td>32.1</td>
<td>38.3</td>
</tr>
<tr>
<td>Some college</td>
<td>17.8</td>
<td>18.1</td>
</tr>
<tr>
<td>College graduate</td>
<td>9.5</td>
<td>6.6</td>
</tr>
<tr>
<td>Post college</td>
<td>11.5</td>
<td>7.0</td>
</tr>
<tr>
<td>Missing</td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Race/ethnicity, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>72.5</td>
<td>69.0</td>
</tr>
<tr>
<td>African American</td>
<td>15.2</td>
<td>18.5</td>
</tr>
<tr>
<td>Mexican American</td>
<td>5.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Other Hispanic</td>
<td>3.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Other</td>
<td>2.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Missing</td>
<td>1.2</td>
<td>0.9</td>
</tr>
<tr>
<td>Age in 1994, M (SD)</td>
<td>57 (3.2)</td>
<td>57 (3.2)</td>
</tr>
<tr>
<td>Depressive symptoms, M (SD)</td>
<td>2.8 (1.3)</td>
<td>3.2 (1.5)</td>
</tr>
<tr>
<td>Body mass index, M (SD)</td>
<td>27.6 (4.4)</td>
<td>27.5 (5.8)</td>
</tr>
<tr>
<td>Functional limitations, M (SD)</td>
<td>1.5 (1.3)</td>
<td>1.7 (1.4)</td>
</tr>
<tr>
<td>Medical comorbidity, M (SD)</td>
<td>1.2 (1.8)</td>
<td>1.7 (2.1)</td>
</tr>
</tbody>
</table>

Table 1 presents sample characteristics for all respondents interviewed between 1994 and 2002 (4,815 men and 5,335 women). The remainder of the analyses focused on just individuals who reported to be currently working at least 20 hr per week at the beginning of a 2-year time period (1,966 men and 1,759 women). Unadjusted mean weight changes between sequential biennial interviews were all positive, or increased over time, for both men and women (see Figure 1). Weight changes were higher for recently retired women (M = 1.5 lbs) than for women who continued to work between biennial interviews (M = 1.4 lbs). The unadjusted mean weight changes between sequential biennial interviews were higher for men continuing to work between biennial interviews (M = 1.1 lbs) than for recently retired men (M = 0.9 lbs).

In the multivariable models that adjusted for all of the covariates identified above, we did not find retirement to be significantly associated with weight change (either 5% gain or loss) among men, regardless of stratification group (see Table 2). For women, however, retirement was significantly related to 5% weight gain, but not to 5% weight loss (see Table 3) when we compared recent retirees to women who continued to currently work at least 20 hr per week during the 2-year interval (OR = 1.24, 95% CI = 1.04–1.48). This relationship between retirement and weight gain was evident among women who began the time period as normal-weight women (OR = 1.30, 95% CI = 1.01–1.69), but not for women who began the time period as overweight or obese (OR = 1.19, 95% CI = 0.93–1.52). When we stratified by type of work...
performed, the relationship between retirement and 5% weight gain was significant only for women working in blue-collar professions (OR = 1.58, 95% CI = 1.13–2.21) and not for women working in white-collar professions (OR = 1.13, 95% CI = 0.92–1.39).

We next conducted two sensitivity analyses to determine the robustness of our findings. First, we recalculated the 5% weight change variables using 4-year intervals instead of the previously described 2-year intervals. For example, we examined the impact of retiring some time during 1994–1996 on weight changes between 1994 and 1998. We found nearly identical, yet just slightly attenuated, results. Second, we recalculated weight change groups using a more stringent definition of at least 10% BMI increase or decrease, using the same 2-year intervals as previously reported. That is, we determined the impact of retirement between the years 1994 and 1996 on a weight gain of at least 10% or weight loss of at least 10% during the same time interval, as compared to no change in weight (−10% < change in BMI < 10%). Using this 10% convention, we did not find any significant relationships between retirement and weight changes.

Finally, we conducted the same set of analyses but instead constructed lagged models in which we modeled retirement during a single 2-year period as a predictor of weight changes in a subsequent 2-year time period. For example, we studied retirement during the years 1994–1996 as a predictor of weight loss or weight gain during the years 1996–1998, and so forth. We did not find any significant relationships between retirement and subsequent weight changes in any of the models for men or women.

### Discussion

We found that retirement was accompanied by 5% weight gain among women, whereas no change in weight surrounded the retirement of men. The relationship between retirement and weight gain among women was only significant among women working in the blue-collar professions and among women who started the time interval not already overweight or obese. Our results were confirmed when we expanded the period for weight change to 4 years instead of 2, yet they were not confirmed when we changed the weight change criteria to 10% instead of 5%. We therefore conclude that retirement may impact significant yet not substantial weight gains among women, or perhaps our analyses were not adequately powered for us to be able to study such large changes in weight.

On the one hand, our results differ from previous reports. For example, Lauque and colleagues (1998) found a significant decrease in weight among men 18 months after retirement, mostly due to a higher likelihood of eating breakfast. We, however, found no significant weight loss among retiring men. Conversely, Morris, Cook, and Shaper (1992) studied 6,057 men aged 40 to 59 over a 5-year follow-up period and compared weight gain among those who remained employed versus those who became unemployed or retired. They found that men who experienced dis-employment, either because of losing a job or retiring, were more likely to gain more than 10% of weight than men who remained continuously employed (7.5% vs 5%). We found no significant weight gain among retiring men, using both 5% and 10% weight gain criterion, although our retired sample did not include men who also lost their jobs.

### Table 3. Impact of Recent Retirement on Weight Changes in Older Women in the Health and Retirement Study (1994–2002)

<table>
<thead>
<tr>
<th>Group</th>
<th>Adjusted OR for Weight Loss of 5% or Greater (95% CI)</th>
<th>Adjusted OR for Weight Gain of 5% or Greater (95% CI)</th>
<th>Wald $X^2 (p)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All women ($n = 1,759$)</td>
<td>1.07 (0.87–1.30)</td>
<td>1.24 (1.04–1.48)**</td>
<td>5.74 (.06)</td>
</tr>
<tr>
<td>Overweight/obese only ($n = 1,082$)</td>
<td>1.15 (0.91–1.45)</td>
<td>1.19 (0.93–1.52)</td>
<td>2.45 (.29)</td>
</tr>
<tr>
<td>Normal weight only ($n = 677$)</td>
<td>0.81 (0.53–1.26)</td>
<td>1.30 (1.01–1.69)**</td>
<td>5.82 (.05)</td>
</tr>
<tr>
<td>White collar only ($n = 1273$)</td>
<td>1.13 (0.89–1.43)</td>
<td>1.13 (0.92–1.39)</td>
<td>2.03 (.36)</td>
</tr>
<tr>
<td>Blue collar only ($n = 994$)</td>
<td>0.88 (0.57–1.37)</td>
<td>1.58 (1.13–2.21)**</td>
<td>8.27 (.02)</td>
</tr>
<tr>
<td>“Other” workers/farmers/military ($n = 4$)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Notes:** “Recent retirement” is during the previous 2 years. Reference category is men who continued to work at least 20 hr a week at the start of each time interval examined. Each model adjusted for baseline functional limitations, medical conditions, depressive symptoms, weight category, physical activity, age, marital status, race/ethnicity, education, occupational category, smoking status, alcohol consumption, time period, and alive status throughout all time periods. OR = odds ratio; CI = confidence interval.

*Insufficient number of women interviewed.

**p < .05.
On the other hand, our results are consistent with other reports. For example, Patrick and colleagues (1986) found that women factory workers showed a significant decrease in physical activity 1 year after retirement, whereas men working as manual laborers who retired did not show significant decreases in physical activity for several years after retirement. If physical activity changes are interpreted as a proxy for weight changes, our findings are congruent with those reported by Patrick and colleagues (1986) because women in the HRS were more likely to gain weight following retirement than women who continued to work. This relationship was evident only among women who worked in blue-collar, and not white-collar, professions. Moreover, like Patrick and colleagues, we did not find this relationship among HRS men.

Because we were interested in exploring whether weight changes associated with retirement may have been the result of changes in physical activity, we evaluated additional multinomial logistic regression models that tested whether retirement was associated with change in physical activity status between study waves (data not shown). We measured change in physical activity status (the outcome in these models) as a polytomous variable indicating whether participants began to vigorously exercise, or stopped vigorously exercising, versus had no change in exercise activity (reference group). We found a significant association between retirement and increased exercise for men, but not for women. Thus, we may not have found a significant relationship between retirement and weight gain among men because they were likely to increase physical activity during the time period surrounding their retirement. We can also conclude that the significant relationship between retirement and weight gain among women may not be due solely to having decreased physical activity, because we did not find a significant association between retirement and exercise among women.

There are several plausible reasons why women may be more likely to gain weight in the period surrounding their retirements than women who continue to work. First, women may be less active, in general, once they retire (Patrick et al., 1986) or have less leisure time exercise (Friedman, Bertrand, Martire, Hochberg, & Harris, 2006), causing their caloric intake to exceed their daily requirements if no modification is made to their usual eating patterns. Our results support this theory because we found a significant relationship between retirement and weight gain among women who worked in blue-collar, but not white-collar, professions. Second, women may eat more once they retire, because their days may not be as structured with respect to meal times and snack breaks. Our finding that retirement was associated with weight gain only among normal-weight women, and not women who were already overweight or obese, might support this theory. Women at a normal weight perhaps might have benefited from the structured eating necessitated by their work schedules. Third, women who retire might need to continue caring for their husbands, grandchildren, and the house, thus making their retirement solely one from work, but not from these home and familial duties. This is consistent with Riley’s (1998) dynamic view of aging (whereby each individual has a unique role that changes throughout the life course and is influenced by both individual as well as social and economic factors), in that the role a woman assumes after retirement may be more heavily influenced by other obligations (family, social, etc.) than those assumed by a man, who may have more individual freedom to define what his unique roles will be. If these women simultaneously feel like they are losing their social networks at work, their sense of accomplishment associated with holding a job, or their personal identity as employees (Friedmann & Havighurst, 1954), or if they feel that they are not getting the needed respect or recognition from postretirement activities (Mein et al., 1998), they may be more likely to increase their caloric intake in response to these feelings.

HRS women born between 1931 and 1941 were likely the first generation in their families to have worked for pay and thus become the inaugural cohort of dual-income families. With less time for tending the house and meal preparation, these women and their husbands likely ate away from the home more often. Upon retirement, these men may be more likely to engage in other hobbies and thus keep relatively physically active, whereas these women may face home obligations preventing them from experiencing these new types of activities. To test a few of these processes, we were able to examine if adding caregiving and volunteer service to our models as covariates significantly changed the significant findings found among women. Neither of these covariates was significantly predictive of weight changes, nor did the addition of these variables change the significance of retirement on weight gain among women in the models we tested. We also tested whether the relationship between retirement and weight changes differed among individuals whose spouses continued to work versus individuals whose spouses were not working. We did not find any differences between these two groups. We should note, however, that the variables entered for caregiving, volunteer service, and spousal employment were crude (yes/no). If researchers want to get a better understanding of these processes, they need to conduct detailed qualitative analyses and ask more rigorous questions during quantitative analyses. The National Institute on Aging has recently prioritized this type of analysis in order to better elucidate the mechanisms that influence behavioral and health changes that accompany retirement.

Before we conclude this article, several limitations warrant mention. First, the respondents of the HRS did not have their heights and weights objectively measured at each time point. Therefore, we had to rely on self-reported information to calculate BMI and the corresponding weight change categories between sequential biennial interviews. Self-reported weights, however, are largely valid for identifying relationships in epidemiological studies (Spencer, Appleby, Davey, & Key, 2002). Also, because we were only assessing percent change in BMI (rather than crude BMI), we can assume that the error patterns reflected in the change scores would be consistent over time. Although longitudinal validity of self-reported weight has not yet been reported for older adults, a recent study by Field, Anjela, and Rosner (2007) conducted on an adolescent sample found that errors in reported weight changes over time were minor (an average of 2.1 lbs for women and 2.8 lbs for men) and not related to demographic or weight-related factors. Second, we were not able to determine whether weight loss (or staying the same weight) was intentional. Weight loss may have occurred if an individual was diagnosed with a disease, such as heart disease, and then urged to lose weight by his or her doctor. Alternatively, weight loss could have been an undesir-
able, unintentional result of having a major illness, like cancer. Although our analyses did adjust for comorbid medical conditions and functional limitations, we were unable to determine the intent of the respondents with respect to weight change or stability. Third, we were only able to determine the relationship between retirement and weight change that occurred between sequential biennial interviews. Therefore, we cannot conclude that the weight gain preceded retirement, because we only know that both the weight change and retirement occurred sometime between these sequential biennial interviews. We did attempt to isolate the temporal impact of retirement on subsequent weight changes by creating lagged models that examined retirement during one 2-year period as a predictor of weight gain or weight loss in the following 2-year time period. For example, we studied whether retirement some time between 1994 and 1996 predicted weight changes between 1996 and 1998. We did not find that retirement predicted subsequent weight changes in any of the lagged models for both men and women. This does not disprove the hypothesis that retirement temporally precedes significant weight changes, however. It suggests that perhaps the weight changes that follow retirement happen closer to the actual date of retirement than years afterward. After all, in the lagged models, some of the retirements might have occurred early on in the 2-year time period (e.g., January 1994), and the weight changes modeled were those that occurred between the 1996 and 1998 interviews. Alternatively, our findings do not rule out the possibility that weight changes actually precede retirement for women. Fourth, we cannot conclude that any changes in weight were due to changes in fat composition. Perhaps a small portion of the recent women retirees started a weight-bearing exercise program upon retirement, increasing their weight by muscle mass instead of fat. And, finally, perhaps the significant relationship found between retirement and weight gain for normal-weight, and not overweight or obese, women was due to how we defined weight gain in this cohort. The crude pounds a normal-weight woman would have needed to gain in order to exceed the 5% BMI threshold criteria would have been smaller than what an overweight or obese women would have required. For example, a normal-weight woman who was 5 foot 6 inches weighing 135 lbs with a BMI of 21.8 would have needed at least a BMI of 22.9 (142 lbs) at the next study wave to qualify as having gained 5% BMI. The same woman qualifying as overweight, weighing 170 lbs with a BMI of 27.4, would have needed at least a BMI of 28.8 (178 lbs) at the next study wave to qualify as having gained 5% BMI. Although the difference is very slight (7-lb gain for the normal-weight woman vs an 8-lb gain for the overweight woman), the crude total pounds needed to qualify as having gained weight is somewhat less for the normal-weight woman. Although the percent BMI metric works well to standardize weight loss, because weight loss is generally easier for people who are more overweight, it is not a perfect metric to standardize weight gain. We do, however, feel that it is still superior to using crude pounds gained to create our thresholds, and thus we feel confident that we have selected the appropriate metric to capture changes in weight.

Those limitations notwithstanding, our study has important implications for future research as well as for improving the health of older adults retiring from the workforce. Based on our findings, it appears that women gain a significant amount of weight (≥5% BMI) in the period surrounding their retirement from the work force. Only women in blue-collar professions and normal-weight women appear to be susceptible to this weight gain upon retirement. It will be important to identify those factors that influence this weight change in order to identify potential targets for preventive efforts. It also will be important to determine if the weight gain is limited to the proximal period of retirement, or whether the trajectory continues for several years thereafter. Furthermore, although the respondents were asked to name an exact date on which they retired from the work force, retirement usually is a transition rather than an event that occurs at a single point in time. Because job responsibilities, intensity, or work hours may also have been changing in the period before the actual named date of retirement, future studies may want to focus on this transition period, as well. Finally, future studies need to focus on explaining why we observed gender differences in the relationship between retirement and weight change. Although we are able to determine that the relationship between retirement and weight change differs by gender using the HRS data set, we are unable to adequately determine the mechanisms by which these changes occur. Future studies that incorporate in-depth qualitative interviews and analyses are warranted.

ACKNOWLEDGMENTS

This research was supported by National Institutes of Health Grant RO3 AG026585 and Veterans Affairs (VA) Merit Review Entry Program Award MRP 04-220-1 granted through the VA’s Health Services Research and Development Service to Dr. Forman-Hoffman. Dr. Wolinsky is the co-center principal investigator of the Center for Research in the Implementation of Innovative Strategies in Practice (CRIISP) at the Iowa City VA Medical Center. Dr. Forman-Hoffman is a CRIISP investigator. Dr. Hillys is a CRIISP statistician, and Dr. Richardson is a CRIISP data analyst. This material is the result of work supported with resources and the use of facilities in CRIISP at the Iowa City VA Medical Center. CRIISP is funded through the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development Service (HFP 04-149).

The views expressed in this article are our own and do not necessarily represent the views of the Department of Veterans Affairs.

V. L. Forman-Hoffman planned the study, supervised the data analysis, and wrote the paper. K. K. Richardson performed the statistical analyses and contributed to revising the paper. J. W. Yankey contributed to the construction of the data set and imputation process. S. L. Hillis oversaw all data analyses. R. B. Wallace and F. D. Wolinsky helped plan the study and revise the manuscript.

CORRESPONDENCE

Address correspondence to Valerie Hoffman, MPH, PhD, Department of Internal Medicine, University of Iowa College of Medicine, SE 605 GH, 200 Hawkins Drive, Iowa City, IA 52242. E-mail: valerie-hoffman@uiowa.edu

REFERENCES


