The prevalence of overweight is rising in the United States despite increased knowledge about the hazards of overweight and increased spending on weight loss programs. Although approximately 40% of adult women and 25% of adult men in the United States report trying to lose weight at any given time, most appear to be gaining weight. According to the Third National Health and Nutrition Examination Survey (NHANES III), the proportion of overweight persons increased from 25% to 33% between 1980 and 1991.1 Over the past 15 years, the mean body weight of US adults (aged 20-74 years) increased by 3.6 kg (7.6 lb).

Overweight and obesity are known risk factors for diabetes,2,3 high blood pressure,4 heart disease,4,5 gallbladder disease,4,6 stroke,5,6 and some forms of cancer.10,11 Weight gain has been associated with increased risk of overall mortality.12 Conversely, weight loss has been associated with improvement in risk factors associated with coronary heart disease (CHD), including high blood pressure, serum cholesterol and triglyceride levels,13 as well as insulin sensitivity.14 However, few studies are available on the impact of weight change on functional health status. Moreover, published information regarding weight change and health-related quality of life has been mainly based on clinically obese subjects.15-19

In a cross-sectional study of 56,510 normal and overweight women aged 45 to 71 years, Coakley et al20 found that women with a body mass index (BMI), calculated as weight in kilograms divided by the square of height in meters, between 30.0 and 34.9 kg/m² exhibited 10% lower function compared with women with BMI ranging from 21.0 to 22.9 kg/m² and that BMI was the single most important predictor of physical function and impaired ability to work, as well as the second most im-

**Context** The mean body weight of US adults increased by 3.6 kg (7.6 lb) during the past 15 years, but few studies exist that examine the impact of such weight change on functional health status.

**Objective** To investigate, prospectively, the association between weight change and health-related quality of life in women.

**Design and Setting** Nurses' Health Study, a 4-year prospective observational study from 1992 to 1996, using the Medical Outcomes Study Short-Form 36 Health Status Survey (a self-administered 36-item questionnaire) to measure quality of life.

**Participants** A cohort of 40,098 women (from 46-71 years old in 1992) grouped according to 3 patterns of weight change over the 4-year period: women whose weight remained within 2.25 kg (5 lb) of their baseline weight, women who lost 2.25 kg (5 lb) or more, and women who gained 2.25 kg (5 lb) or more.

**Main Outcome Measures** Change in scores on 7 health-related quality-of-life dimensions: physical functioning, vitality, bodily pain, limitations in role functioning due to emotional or physical problems, social functioning, and mental health, measured by the Short-Form 36 Health Status Survey.

**Results** A total of 15,602 women (39%) maintained their weight, 15,160 (38%) gained between 2.25 and 9.0 kg (5-20 lb), and 6667 (17%) lost between 2.25 and 9.0 kg (5-20 lb). Weight gain was associated with decreased physical function and vitality, and increased bodily pain regardless of baseline weight. For example, the odds ratio for developing role limitations due to physical problems was 2.05 (95% confidence interval, 1.69-2.49) for the leanest women who gained 9.0 kg (20 lb) or more. Weight loss in overweight women was associated with improved physical function and vitality as well as decreased bodily pain. Weight change was more strongly associated with physical rather than mental health. The impact of weight change, especially weight gain, was just as strong in women 65 years and older as in women younger than 65 years.

**Conclusions** These longitudinal data support current US guidelines for women of all body mass index levels to avoid weight gain. Weight maintenance and, in cases of overweight, weight loss are desirable and likely to be beneficial for physical function, vitality, and bodily pain.
important predictor of vitality (after physical activity).

In this study, we set out to investigate, longitudinally, the association between weight change and change in functional health status among normal and overweight women.

METHODS

The Nurses’ Health Study Cohort

The Nurses’ Health Study cohort was established in 1976 when 121,700 female registered nurses aged 30 through 55 years completed a mailed questionnaire about risk factors for cancer and cardiovascular diseases. Since then, follow-up questionnaires have been mailed every 2 years to the entire cohort to update information on a variety of health risk factors including body weight and the occurrence of major illnesses. A follow-up rate of higher than 90% has been maintained through the 20-year period. Further details of the Nurses’ Health Study have been described. In 1992 and again in 1996, the Medical Outcomes Study Short-Form 36 Health Status Survey (SF-36) was administered to the cohort.

SF-36 Health Survey

The SF-36 questionnaire was developed from the Medical Outcomes Study. It is a self-administered, 36-item questionnaire that measures health-related quality of life in 8 domains: physical functioning, role limitations due to physical problems, role limitations due to emotional problems, vitality, bodily pain, social functioning, mental health, and general health perceptions. Each domain is scored separately from 0 (lowest level of functioning) to 100 (highest level). The instrument has been extensively validated within the Medical Outcomes Study and in other settings. It has been demonstrated to have good construct validity, as well as high internal consistency and high test-retest reliability.

In the present study, we examined the relationship between patterns of weight change and 7 scales of the SF-36: physical functioning, measured by 10 items gauging the ability to perform certain activities of daily living; role limitations due to physical problems, measured by 4 items indicating whether one’s physical health impaired one’s ability to perform work or other roles; role limitations due to emotional problems, measured by 3 items indicating limitations in performing usual roles due to emotional problems; vitality, as measured by 4 items indicating levels of energy and fatigue; bodily pain, measured by 2 items indicating frequency of bodily pain and its interference with daily activities; social functioning, measured by 2 items indicating the impact of physical health and emotional problems on social activities; and mental health, measured by 5 items indicating anxiety, depression, loss of behavioral or emotional control, and psychological well-being. The general health perceptions scale was not analyzed due to the omission of 1 item from the baseline SF-36 questionnaire.

Predictor Variables

BMI. The BMI data were calculated from height taken from the 1976 baseline questionnaire and from weight as reported on the 1992 questionnaire. The validity of self-reported weight in this cohort has been established. One hundred eighty-four women were weighed by technicians 6 to 12 months after completing a mailed questionnaire. The weight reported in the questionnaire was highly correlated with measured weight (Spearman \( r = 0.96 \)).

Categorization of Weight Change

For the purpose of this study, we included the cohort members who reported weights in 1992, 1994, and 1996. Subjects were categorized into 1 of 3 mutually exclusive weight-change groups according to their patterns of weight change over the 4-year period (1992-1996): weight losers, weight gainers, and weight maintainers. The following definitions were used for categorization:

Weight Losers. Women who lost 2.25 kg (5 lb) or more between 1992 and 1996 and did not gain 2.25 kg (5 lb) or more during either 2-year interval (ie, 1992-1994, 1994-1996) were considered weight losers. Women in this category could lose 2.25 kg (5 lb) or more in 1 of the 2 intervals, or in both intervals, or they could lose less than 2.25 kg (5 lb) in each interval as long as the net loss was 2.2 kg (5 lb) or more over the entire follow-up period. Weight losers were further divided into 2 groups: those who lost between 2.25 and 9.0 kg (5-20 lb) and those who lost more than 9.0 kg (20 lb).

Weight Gainers. This group included women who gained 2.25 kg (5 lb) or more between 1992 and 1996 and did not lose 2.25 kg (5 lb) or more in either 2-year interval. Women in this category could gain 2.25 kg (5 lb) or more in either of the 2 intervals, or in both intervals, or they could gain less than 2.25 kg (5 lb) in each interval as long as the net gain was 2.25 kg (5 lb) or more over the 4-year follow-up. Weight gainers were further classified into 2 groups: those who gained between 2.25 and 9.0 kg (5-20 lb) and those who gained more than 9.0 kg (20 lb).

Weight Maintainers. This category included women whose weight in 1996 was within 2.25 kg (5 lb) of their original weight in 1992 and who did not gain or lose more than 2.25 kg (5 lb) during either 2-year interval (1992-1994 or 1994-1996).

Covariates

We determined information on a range of potential confounders, including age, cigarette smoking, levels of physical activity, alcohol consumption, and self-reported comorbid conditions (diabetes, hypertension, hypercholesterolemia, rheumatoid arthritis, and osteoarthritis). Recreational physical activity was determined using a reproducible, validated questionnaire, which assessed the frequency of 8 common leisure-time physical activities during the past year. The physical activity battery enabled us to calculate a weekly activity score expressed in metabolic-equivalent hours (MET-hours) per week that accounted for both the type and duration of activities. Alcohol consumption, defined as grams of ethanol...
consumed per day, was assessed on the 1990 questionnaire. The validity of self-reported alcohol intake has been established in this cohort.\textsuperscript{31}

With the exception of alcohol intake, which was determined in 1990, all other covariates were assessed in 1992. We also included as covariates development of any new comorbid condition including diabetes, hypertension, hypercholesterolemia, and rheumatoid arthritis and osteoarthritis between 1992 and 1996.

**Study Population**
A total of 75 453 women responded to a single-baseline mailing of the SF-36 questionnaire (69\% response rate). Of these women, 67 247 women were alive in 1996 and completed the follow-up SF-36 questionnaire, as well as provided information on weight in 1992, 1994, and 1996. An additional 1441 women were excluded because more than 50\% of the responses on the SF-36 subscales were missing (if less than half of the items were missing, we used the imputation method described by Ware et al\textsuperscript{23}). In a previous study,\textsuperscript{20} we analyzed the characteristics of women who did not complete the SF-36 survey. On average, these women tended to be somewhat older, heavier, and more sedentary than those who completed the survey. However, there was substantial overlap (eg, equivalent interquartile ranges) in the distribution of these characteristics, indicating low likelihood of substantial selection bias. To control for underlying illness as a cause of both weight loss and decline in functional health status, we excluded women who reported a diagnosis of cancer, angina, myocardial infarction, coronary revascularization, or stroke prior to June 1996 (n = 14 526). We also excluded women with missing data on major covariates, as well as abnormal values for exercise (>30 h/wk), and alcohol consumption (>7.05 L [235 fl oz] per week) (n = 5905). The final study sample thus consisted of 45 375 women, classified as: 7513 weight losers, 16 983 weight gainer, 15 602 weight maintainers, as well as 5277 women whose pattern of weight change did not fit of the first 3 categories (weight fluctuators, who were not analyzed further in this study).

**Data Analysis**
We stratified all analyses by baseline BMI and age group. According to a recent study,\textsuperscript{32} the impact of weight on mortality differs among women who are younger and older than 65 years. Based on this study, we stratified the cohort into 2 age groups: younger women (<65 years in 1992) and older women (aged 65 years and older in 1992). Analyses were further stratified by BMI measured in 1992. The BMI strata were: less than 25.0 kg/m\textsuperscript{2}, 25.0 through 29.9 kg/m\textsuperscript{2}, 30.0 through 34.9 kg/m\textsuperscript{2}, and 35.0 kg/m\textsuperscript{2} or higher. These categories are consistent with the World Health Organization (WHO) international BMI cut points, which have been adopted as weight guidelines in the United States.\textsuperscript{33} According to these guidelines, a BMI lower than 25.0 kg/m\textsuperscript{2} is considered within normal range, a BMI from 25.0 through 29.9 kg/m\textsuperscript{2} is termed preobese, and a BMI of 30.0 kg/m\textsuperscript{2} and higher is considered obese and includes 3 classes. The BMI range for class 1 obesity is 30.0 through 34.9 kg/m\textsuperscript{2}, class 2, 35.0 through 39.9 kg/m\textsuperscript{2}, and class 3, 40.0 kg/m\textsuperscript{2} and higher.

Ordinary least squares regression was used in which SF-36 subscale scores in 1996 were regressed on weight change patterns, baseline SF-36 score in 1992, as well as other covariates. Because of the presence of ceiling effects, we used logistic regression to analyze the role-physical and role-emotional functioning scales for which the outcomes were dichotomized as weight guidelines in the United States.\textsuperscript{33} According to these guidelines, a BMI lower than 25.0 kg/m\textsuperscript{2} is considered within normal range, a BMI from 25.0 through 29.9 kg/m\textsuperscript{2} is termed preobese, and a BMI of 30.0 kg/m\textsuperscript{2} and higher is considered obese and includes 3 classes. The BMI range for class 1 obesity is 30.0 through 34.9 kg/m\textsuperscript{2}, class 2, 35.0 through 39.9 kg/m\textsuperscript{2}, and class 3, 40.0 kg/m\textsuperscript{2} and higher.

Ordinary least squares regression was used in which SF-36 subscale scores in 1996 were regressed on weight change patterns, baseline SF-36 score in 1992, as well as other covariates. Because of the presence of ceiling effects, we used logistic regression to analyze the role-physical and role-emotional functioning scales for which the outcomes were dichotomized as any limitation (score ≤100) vs no limitation (score >100). A total of 71.4\% of the women scored 100 on the role-emotional scale and 62\% scored a 100 on the role-physical scale.

Age, physical activity (MET-hours) per week, alcohol consumption, and BMI were included as continuous variables. Smoking status in 1992 was divided into 3 categories: past and current smokers and never have been smokers.

We created 4 indicator variables that indicated a diagnosis prior to 1992 of the following medical conditions related to obesity: diabetes mellitus, high blood pressure, hypercholesterolemia, and self-reported arthritis. Since the development of chronic conditions is 1 of the presumed pathways by which overweight adversely affects quality of life, we developed a second set of indicator variables based on the incident reports of 1 of these conditions between 1992 and 1996. This enabled us to examine whether the effect of weight change on health-related quality of life might be mediated by the development of 1 of these obesity-related conditions. For all analyses, the referent group consisted of women classified as stable weight maintainers between 1992 and 1996.

**RESULTS**
The mean age of the study population was 58.5 years (range, 46-71 years) in 1992. In 1992, 75\% of the cohort was younger than 65 (n = 30 074), and 25\% of the population 65 years or older (n = 10 024). Approximately two fifths (39\%) of the group maintained their weight (n = 15 602), two fifths (38\%) had gained between 2.25 and 9.0 kg (5-20 lb) (n = 15 160), and one fifth had lost between 2.25 and 9.0 kg (5-20 lb) (n = 6667). At the extremes of weight change, 5\% were categorized as having gained more than 9.0 kg (20 lb) (n = 1823), while 2\% had lost more than 9.0 kg (20 lb) (n = 846).

At baseline in 1992, more than half of the population had a BMI of lower than 25.0 kg/m\textsuperscript{2} (n = 20 954), and another third had a BMI in the 25.0- to 29.9-kg/m\textsuperscript{2} range. Less than 5\% of the women had a BMI of 35 kg/m\textsuperscript{2} or higher (TABLE 1). Higher BMI and older age were associated with lower mean scores on physical functioning, freedom from bodily pain, and role functioning—physical at baseline. The baseline distribution of health behaviors according to weight change categories is shown in TABLE 2. Those who maintained their weight engaged in the highest mean levels of exercise (12.5 MET-
h/wk). Those who lost 9.0 kg (20 lb) or more had the lowest levels of exercise (7.7 MET-h/wk), the highest prevalence of comorbid conditions, and the highest average weight in 1992 (82 kg) [196 lb].

**Change in Health-Related Quality of Life Scores**

**Women Younger Than 65 Years.**

Weight gain was associated with decreased functioning among women younger than 65 years in every BMI category. With between 5- to 11-point score decrements, the most dramatic reductions were apparent on scales of physical function, vitality, and bodily pain among women who gained 9.0 kg (20 lb) or more over a 4-year period. (FIGURE 1, A-C). Weight gain of 9.0 kg (20 lb) or more was also associated with increased odds ratios of role limitations due to physical problems, ranging from 2.4 (women with BMI <25.0 kg/m$^2$) up to 9.9 (BMI >35.0 kg/m$^2$). However, weight gain was not associated with change in mental health in older women.

Weight loss was associated with significant improvements in physical function among women in the 2 highest BMI categories (FIGURE 2, A). However, weight loss was also associated with decreased physical functioning, vitality, and mental health, and increased bodily pain among the leanest women (BMI <25.0 kg/m$^2$) (FIGURE 2, A-D). For example, among the most overweight women (≥35.0 kg/m$^2$), weight loss of 9.0 kg (20 lb) or more was associated with a 6.9 point improvement in physical function (P<.05); whereas, among women in the lowest BMI category, a comparable weight loss was paradoxically associated with a 12-point decrease in physical function (P<.001) (FIGURE 2, A) as well as associated with nearly 2.7 times the risk of developing role limitations due to physical problems.

### Table 1. Mean Scores on SF-36 Subscales at Baseline, According to Age-Group and Body Mass Index (BMI) Category

<table>
<thead>
<tr>
<th>Age, y</th>
<th>BMI Weight Category, kg/m$^2$</th>
<th>SF-36 Subscale</th>
<th>&lt;25.0 (n = 20,954)</th>
<th>25.0-29.9 (n = 12,949)</th>
<th>30.0-34.9 (n = 4,349)</th>
<th>≥35.0 (n = 1,846)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65</td>
<td>Physical function</td>
<td>91.2</td>
<td>88.4</td>
<td>83.4</td>
<td>74.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bodily pain</td>
<td>78.0</td>
<td>74.4</td>
<td>70.3</td>
<td>65.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitality</td>
<td>65.4</td>
<td>62.9</td>
<td>59.0</td>
<td>54.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mental health</td>
<td>75.9</td>
<td>76.3</td>
<td>75.6</td>
<td>74.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role functioning-physical</td>
<td>81.8</td>
<td>77.8</td>
<td>75.2</td>
<td>65.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role functioning-emotional</td>
<td>84.7</td>
<td>83.0</td>
<td>81.9</td>
<td>78.6</td>
<td></td>
</tr>
<tr>
<td>≥65</td>
<td>Physical function</td>
<td>83.7</td>
<td>81.0</td>
<td>72.6</td>
<td>62.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bodily pain</td>
<td>75.4</td>
<td>72.7</td>
<td>66.5</td>
<td>61.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitality</td>
<td>67.8</td>
<td>65.3</td>
<td>60.2</td>
<td>56.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mental health</td>
<td>78.5</td>
<td>79.5</td>
<td>78.3</td>
<td>78.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role functioning-physical</td>
<td>74.9</td>
<td>69.9</td>
<td>63.2</td>
<td>53.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role functioning-emotional</td>
<td>84.9</td>
<td>84.4</td>
<td>81.1</td>
<td>77.9</td>
<td></td>
</tr>
</tbody>
</table>

*SF-36 indicates Medical Outcomes Study Short-Form 36 Health Status Survey.

### Table 2. Age-Standardized Baseline Health Behaviors and Diagnosed Chronic Conditions According to Pattern of Weight Change

<table>
<thead>
<tr>
<th>Weight Change Pattern</th>
<th>Lost ≥9.0 kg (20 lb)</th>
<th>Lost 2.25-8.5 kg (5-19 lb)</th>
<th>Maintained</th>
<th>Gained 2.25-8.5 kg (5-19 lb)</th>
<th>Gained ≥9.0 kg (20 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of subjects (%)</td>
<td>846 (2)</td>
<td>6667 (17)</td>
<td>15,602 (39)</td>
<td>15,160 (38)</td>
<td>1823 (4)</td>
</tr>
<tr>
<td>Physical activity, MET-h/wk</td>
<td>7.7</td>
<td>10.2</td>
<td>12.5</td>
<td>11.4</td>
<td>10.5</td>
</tr>
<tr>
<td>Alcohol consumption, g/wk</td>
<td>11.0</td>
<td>15.3</td>
<td>15.8</td>
<td>14.3</td>
<td>10.5</td>
</tr>
<tr>
<td>1992 mean BMI, kg/m$^2$</td>
<td>32.5</td>
<td>27.0</td>
<td>24.3</td>
<td>26.0</td>
<td>28.0</td>
</tr>
<tr>
<td>Mean weight 1992, kg (lb)</td>
<td>82.0 (186.0)</td>
<td>72.0 (160.0)</td>
<td>64.4 (143.0)</td>
<td>69.0 (153.0)</td>
<td>76.0 (169.0)</td>
</tr>
<tr>
<td>Mean weight 1996, kg (lb)</td>
<td>74.0 (164.0)</td>
<td>68.0 (150.0)</td>
<td>65.0 (144.0)</td>
<td>73.0 (162.0)</td>
<td>90.0 (199.0)</td>
</tr>
<tr>
<td>Baseline prevalence, %</td>
<td>Current smoker</td>
<td>14.0</td>
<td>16.0</td>
<td>12.0</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>Former smoker</td>
<td>13.0</td>
<td>15.0</td>
<td>11.0</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>Hypertension</td>
<td>33.0</td>
<td>24.0</td>
<td>18.0</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>High cholesterol</td>
<td>32.0</td>
<td>31.0</td>
<td>30.0</td>
<td>33.0</td>
</tr>
<tr>
<td></td>
<td>Diabetes</td>
<td>7.0</td>
<td>4.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

*MET indicates metabolic-equivalent hours; BMI, body mass index.
Involuntary Weight Loss. The study did not collect information on intentionality of weight loss. Weight loss is often a symptom of underlying illness.\textsuperscript{33} While we attempted to take account of major illnesses, we lacked data on some diagnoses (eg, congestive heart failure). We found that among the leanest women (BMI <25.0 kg/m\textsuperscript{2}), especially in the older age group, weight loss was associated with a paradoxical deterioration in physical function, vitality, and freedom from bodily pain (Figure 2, A-C). The number of women in the leanest BMI category who lost large amounts of weight was quite small (n = 51 in the older age group, and n = 44 in the younger age group). Nonetheless, we conducted a more detailed examination to identify whether weight loss in this group may have been involuntary, perhaps due to preclinical disease. Among the 95 leanest women in this study who lost 9.0 kg (20 lb) or more pounds, the average attained BMI decreased from 23.3 kg/m\textsuperscript{2} in 1992 to 19.0 kg/m\textsuperscript{2} in 1996. Compared with women in all other weight categories, these women had lower baseline levels of self-rated health perceptions, higher levels of comorbid diseases (hypertension and arthritis), much higher levels of current and past smoking, and lower exercise levels. For example, 34\% of these women were current smokers and 34\% had previously smoked while no more than 19\% of the women in other weight change categories currently smoked. Similarly, the fact that these women engaged in low levels of exercise suggested that they were not actively attempting to lose or control their weight. These factors suggested that their weight loss might be involuntary, due to an underlying physical or mental illness.

**COMMENT**

Obesity is one of the most important determinants of health-related quality of life in women\textsuperscript{20}; however, few data...
have been published on the relationship between weight change (weight gain or weight loss) and functional health status in nonclinically obese populations. In our study, weight gain was consistently associated with declines in physical functioning and vitality, as well as increased levels of pain among women of all ages and baseline BMI levels, including women of normal weight. Conversely, weight loss was associated with improved physical function and decreased bodily pain among women in the 2 heaviest BMI categories (BMI $\geq 30.0$ kg/m$^2$). Associations between weight gain and loss of functioning were just as strong among older women as among younger women.

Weight change was more strongly associated with the physical than the mental components of health-related quality of life.

In terms of the clinical significance of our findings, the average decline in physical function of 6.9 points experienced by younger, lean women who gained 9.0 kg (20 lb) or more over 4 years (compared with women of stable weight), was nearly 3 times the magnitude of the decline in physical function associated with cigarette smoking (average 2.5-point decrease) over the same period.

An important limitation of the present study was the lack of availability of information describing whether or not weight loss was intentional. It was not always possible to establish the direction of causality or to rule out the possibility that depression or some other underlying illness caused weight change. This was especially the case among the older, leanest women (BMI $<25.0$ kg/m$^2$) who lost large amounts of weight and simultaneously experienced declining functional health status. The number of women in this category was small (n = 95), including 0.5% of the study population, and they do not affect our main conclusions.

Our study population was based on women aged 46 to 72 years. The impact of weight change on functional health status in women in other age groups, spe-
specifically in younger women, might differ. Although our study population of registered nurses is not representative of the general US population, the baseline scores on SF-36 scales in this cohort are quite comparable to a similarly aged group of working US women. In conclusion, these longitudinal data indicate a strong association between weight change and change in health-related quality of life among normal weight and overweight middle-aged women. Our findings support current US guidelines for women of all BMI levels to avoid weight gain during adulthood. For overweight women, weight loss can substantially improve physical function.

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Acknowledgment: We are indebted to the participants in the Nurses’ Health Study for their continuing cooperation, and to Mark Shneyder, Karen Corrano, MA, Gary Chase, Barbara Egan, and Lisa Dunn for their expert help.

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