Background: Life expectancy is greater for people with favorable midlife cardiovascular risk profiles (ie, low risk). However, some speculate that increased longevity may lead to large numbers of ill, disabled, older persons with lower quality of life. Few data exist on this important issue. This study evaluates the relationship of midlife low-risk status to quality of life and illness in older age.

Methods: Cohort of middle-aged adults from the Chicago Heart Association Detection Project in Industry (2692 women and 3650 men; baseline ages, 36-64 years [average age, 73.2 years in 1996]) without baseline (1967-1973) major electrocardiographic abnormalities or history of diabetes or myocardial infarction. Quality of life (12-item Health Status Questionnaire [HSQ-12] on physical, mental, and social well-being) and self-reported diseases were assessed after 26 years of follow-up. Baseline risk strata included low risk (favorable blood pressure and serum cholesterol levels, no smoking, and no minor electrocardiographic abnormalities); 0 risk factors (ie, no high risk factors but ≥1 risk factors not at favorable levels); or any 1, any 2, or 3 or more of the following 4 risk factors: high blood pressure, high serum cholesterol level, smoking, and minor electrocardiographic abnormalities. The HSQ-12 scores and disease outcomes for low risk were compared with other strata.

Results: Adjusted scores for physical, mental, social functioning, and disease-free outcomes were highest for low-risk individuals and decreased significantly with number of risk factors (eg, 58% of low-risk women had excellent/very good health compared with 28% of women with ≥3 risk factors).

Conclusions: Favorable cardiovascular risk profile in middle age is associated with better quality of life and lower risk of diseases in older age. Moreover, the fewer the risk factors, the higher the quality of life.

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EXTENSIVE EVIDENCE has been amassed showing that major coronary risk factors, particularly adverse serum cholesterol and blood pressure levels and smoking, are powerful long-term predictors of cardiovascular morbidity and mortality. This knowledge has contributed to the development of prevention and control programs to curb the epidemic impact of coronary heart disease (CHD). Related to these and other efforts, mortality from CHD, cardiovascular disease (CVD), and all causes has declined steadily in the United States and other Western societies during the last several decades with a consequent gain in life expectancy. At present, an individual reaching age 65 years can expect to live on average nearly 18 additional years, and life expectancy is likely to continue to rise. However, some speculate that increased longevity may lead to greater morbidity, with a greater number of years afflicted by chronic illnesses and disabilities resulting in lower quality of life.

The fear that increasing longevity leads to an older population of frail and disabled persons may be unfounded. Evidence suggests that middle-aged persons with healthier lifestyles not only survive longer, but their disability is postponed and compressed into fewer years. Thus, benefits of favorable levels of all major cardiovascular risk factors and/or a healthful lifestyle (ie, low-risk status) at younger ages may encompass not only lower age-specific mortality, greater longevity, and substantially lower health care costs but also higher quality of life (ie, prolongation of independent and healthy living) with less illness in older age. Few studies have examined the association of baseline risk factors with health-related quality of life, particularly in low-risk men and women.

We report on relations of baseline cardiovascular risk assessed in middle-aged...
men and women to subsequent health-related quality of life and morbidity in older age after an average follow-up of 26 years using data from the Chicago Heart Association Detection Project in Industry (CHA).

**METHODS**

**PARTICIPANTS AND BASELINE EXAMINATION**

From November 1967 to January 1973, the CHA study screened 39,522 men and women 18 years and older and of varied ethnicities and socioeconomic levels, who were employed by 84 Chicago-area organizations. Standardized examination methods were used, as reported elsewhere. Briefly, screening was done by 2 trained and standardized field teams who measured height, weight, serum total cholesterol, and supine blood pressure. Participants completed a questionnaire about their demographic characteristics, smoking history, medical history, and medical treatment of hypercholesterolemia, hypertension, diabetes, and myocardial infarction (MI). Resting electrocardiograms (ECGs) were classified as showing major, minor, or no abnormalities based on criteria of the Hypertension Detection Follow-up Program.

**FOLLOW-UP QUESTIONNAIRE**

In 1996, a follow-up health survey was mailed to all surviving CHA study participants who were between 36 and 64 years old at baseline and were 65 years and older in 1996, hence eligible for this study (n = 13,262). For 92.6% of these individuals, current addresses were obtained from the Centers for Medicare & Medicaid Services (CMS, formerly Health Care Financing Administration) by matching study records with name, sex, date of birth, and Social Security number. When current addresses were not available from the CMS, effort was made to locate them through online searches and submission to Equifax Inc, McLean, Va. For questionnaires returned with forwarding addresses, a second mailing was sent. Of the 13,262 questionnaires mailed, 7,822 (5.9%) were returned by the postal service without forwarding addresses, and another 150 participants were reported by their next of kin to be recently deceased. Only 521 questionnaire recipients (3.9%) explicitly refused to participate in the study. Questionnaires (n = 7,381) were received from 59.9% of participants with available addresses (n = 12,330, including the explicit refusals), with an average follow-up of 25.8 years. The 4-page questionnaire included assessments of health-related quality of life, risk factors, habitual exercise pattern, alcohol consumption, smoking history, history of diseases and conditions (eg, MI, angina, congestive heart failure, stroke, and diabetes), and current medication use for hypertension, hypercholesterolemia, diabetes, and hormone therapy (for women). Institutional review board approval was granted to contact participants by mail 26 years after baseline examination.

**EXCLUSIONS**

Of the 7,381 participants 65 years and older in 1996 who completed the questionnaire, 1,039 were excluded for the following reasons: prevalent diseases at baseline (ie, history of physician-diagnosed or ECG evidence of MI [n = 60], major ECG abnormalities [n = 519], and physician-diagnosed diabetes [n = 142]), because quality of life at follow-up would be influenced by long-standing morbidity; missing baseline data on diabetes (n = 21), smoking (n = 2), blood pressure (n = 5), serum cholesterol level (n = 25), education (n = 6), height or weight (n = 2); or missing follow-up questionnaire data (n = 257). Thus, the present study is based on 2,692 women and 3,650 men 65 years and older (average age, 73.2 years), with complete data on baseline risk factors and follow-up measures of quality of life (Figure 1).

**CARDIOVASCULAR RISK GROUPS**

Participants free of MI, diabetes, and major ECG abnormalities were classified into 5 groups according to baseline CV risk status. Those with favorable levels of all the following baseline characteristics were considered to be at low risk for CVD: systolic blood pressure (SBP)/diastolic blood pressure (DBP) 120/80 mm Hg or below and not receiving antihypertensive medication; serum cholesterol level below 200 mg/dL (<5.2 mmol/L); no current smoking; and no minor ECG abnormalities. Participants not at low risk were classified as having 0 risk factors (no high risk factors but 1 or more risk factors not at favorable levels), or any 1, any 2, or more of the following 4 risk factors: SBP 140 mm Hg or greater or DBP 90 mm Hg or greater or receiving antihypertensive medication, serum cholesterol level 240 mg/dL or greater (≥6.2 mmol/L); current cigarette smoking; or any minor ECG abnormality.

**QUALITY OF LIFE ASSESSMENT**

The self-reported 12-item Health Status Questionnaire (HSQ-12), developed by Health Outcomes Research, was used to measure quality of life. Validity and reliability of the HSQ-12 in measuring quality of life in older individuals have been demonstrated. Similar to the Medical Outcomes Trust Short-Form Health Survey (SF-12), HSQ-12 provides measures of physical and social functioning and mental health by evaluating 8 health domains: (1) health perception, (2) physical functioning (ie, ability to perform daily tasks and activities), (3) role limitations attributable to physical health, (4) bodily pain, (5)
energy, fatigue, social functioning (ie, degree to which physical or emotional problems interfere with individual social activities), role limitations attributable to mental health, and mental health (ie, subjective evaluation of one’s own emotional well-being). For each item, categorical responses ranging from 3 to 6 categories are scaled into numeric scores ranging from 0 (poorest health) to 100 (optimal health) according to HSQ-12 scoring protocol. Categorical responses to each HSQ-12 item were also dichotomized to indicate favorable outcomes (eg, excellent or very good self-rated health vs all others).

**STATISTICAL ANALYSES**

Analyses across the 5 risk groups were done separately for women and men. F tests (for continuous variables) or \( \chi^2 \) (for categorical variables) were used to detect statistically significant differences in baseline characteristics across the strata. General linear models were used to compute group mean domain scores adjusted for age (in 1996), race (African American or not), and baseline education (years). The risk group was entered in the linear models as a class variable. Linear trends were tested across these groups as ordinal variables with values of 1 to 5. Additional models were also adjusted for baseline body mass index (BMI). Sex-specific and age-, race-, and education-adjusted prevalence (percentage) of favorable HSQ-12 outcomes and self-reported CHD, CVD, other major chronic diseases, and current medication use for hypertension, hypercholesterolemia, and diabetes, were calculated by baseline risk status using general linear models. These values are covariate-adjusted least squares estimates. Linear trends were tested using logistic regression, with risk status as an ordinal variable. Since minor ECG abnormalities may represent only incidental findings, particularly in women, to examine impact of the 3 readily measured major pre-

**BASELINE CHARACTERISTICS**

There were 264 (9.8%) women and 229 (6.3%) men who met the criteria for low risk (Table 1). On average, at baseline low-risk men and women were younger, better educated, and had lower BMI. By definition, average serum cholesterol and blood pressure values were also markedly lower for low-risk subgroups compared with others. For example, for women at low risk, mean cholesterol level was lower by 35 mg/dL (0.9 mmol/L), and SBP and DBP were lower by 19 and 9 mm Hg, respectively, compared with women with any 1 risk factor. Response rate for low-risk persons to the 1996 health survey was 70.1% compared with 66.6%, 60.2%, 55.7%, and 51.0% of per-

**ADJUSTED PREVALENCE OF FAVORABLE HSQ-12 OUTCOMES**

For each of the 12 items, age-, race-, and education-adjusted prevalence of favorable outcomes for physical, mental, and social functioning were highest for low-risk women and decreased with number of cardiovascular risk factors (P values for trend ranged from <.05 to <.001) (Table 2). For example, the percentage of low-risk women perceiving themselves as having excellent or very good health was more than double that of women with 3 or more risk factors (57.6% vs 27.9%). In general, similar results were observed among men, except for items dealing with mental health (eg, feeling downhearted and blue and being a happy person), for which no significant differences in prevalence across groups were observed.

With the exclusion of persons with minor ECG abnormalities, results were consistent with those for the full sample and remained statistically significant. Figure 2 shows examples of favorable outcomes for 4 HSQ-12 items representing physical, mental, and social aspects of quality of life. For both women and men, percentages of low-risk individuals reporting excellent or very good health and no limitations in walking several blocks were markedly higher than for those with 0, any 1, any 2, or all 3 risk factors (all P values for trend <.001). Modest differences in social functioning across the risk groups were observed for both men and women (P <.05); differences in mental health (feeling downhearted and blue) across risk groups were seen in women (P = .02) but not in men (P = .48).

**ADJUSTED MEAN HSQ-12 DOMAIN SCORES**

Age-, race-, and education-adjusted mean HSQ-12 scores for the 8 domains by risk factor group and sex are given in Table 3. There is an inverse graded relationship between baseline risk status and all 8 health-domain scores for women, and for health perception, physical functioning, and role limitations attributable to physical health for men. The better the risk profile, the higher the score (eg, low-risk women had an adjusted health perception score of 70.2, which is, respectively, 7.2, 9.6, 13.0, and 24.9 points higher than for women with 0, any 1, any 2, and ≥3 risk factors). In general, the inverse associations were stronger for physical health (ie, physical functioning, physical role limitations, and bodily pain) than for mental or social well-being. Tests for linear trend showed that most were statistically significant at P <.001. Similar differences in scores across groups were observed with exclusion of persons with minor ECG abnormalities at baseline. Additional adjustment for BMI, a risk factor correlated with other CVD risk factors such as blood pressure and cholesterol, lowered the HSQ-12 mean scores only slightly. For example, health perception scores for women ranged from 69.0 (low risk) to 46.0 (≥3 risk factors) and for men from 70.4 to 59.3.

**DISEASES AND MEDICATION USE**

Age-, race-, and education-adjusted prevalence of diseases was strong and graded across risk groups
Our findings, based on an average follow-up of 26 years, show that favorable levels of all major CVD risk factors in middle age were associated with substantially better health-related quality of life and less illness in older age. Higher proportions of men and women with low cardiovascular risk status in middle age had no limitations in basic activities associated with physical, mental, and social functioning; contrariwise, prevalence of having no limitations decreased with number of cardiovascular risk factors. Associations tended to be stronger, more graded, and more significant for women than for men and for physical and social functioning than for mental health, possibly because of lower response rates among persons with poorer mental and social functioning. Furthermore, age-, race-, and education-adjusted prevalence of cardiovascular and noncardiovascular diseases and history of medication use for certain conditions (ie, hypertension, hypercholesterolemia, and/or diabetes) were lowest among low-risk men and women. In addition, there were corresponding findings with consideration of only the 3 major coronary risk factors: serum cholesterol, blood pressure, and cigarette smoking. These traits are important because of their high prevalence and impact on risk.
sons with chronic diseases and disabilities. Some fear that increased life expectancies will lead to rising numbers of frail, disabled, and institutionalized older persons, suggesting that one reason for recent increases in prevalence of chronic diseases and their accompanying limitations among older persons may be longer survival. However, it has also been proposed that age of onset of morbidity can be postponed, reducing years of survival. However, it has also been proposed that age of onset of morbidity can be postponed, reducing years of life and morbidity.

With the population segment 65 years and older expanding rapidly in the United States and other industrialized countries, an evident trend in health care is the shift toward caring for increasing numbers of older persons with chronic diseases and disabilities. Some fear that increased life expectancies will lead to rising numbers of frail, disabled, and institutionalized older persons, suggesting that one reason for recent increases in prevalence of chronic diseases and their accompanying limitations among older persons may be longer survival. However, it has also been proposed that age of onset of morbidity can be postponed, reducing years of disability and disease to a brief period before death.

### Table 2. Multivariable-Adjusted Prevalence of Favorable Responses to 12 Items in the HSQ-12 Among 2692 Women and 3650 Men 65 Years or Older in 1996 by Baseline Risk Status, 1967-1973*

<table>
<thead>
<tr>
<th>HSQ-12 Item†</th>
<th>Response Categories</th>
<th>Low (n = 264)</th>
<th>0 RF (n = 602)</th>
<th>1 RF (n = 1189)</th>
<th>2 RFs (n = 534)</th>
<th>≥3 RFs (n = 103)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in 1996</td>
<td>Years</td>
<td>71.5</td>
<td>73.5</td>
<td>74.2</td>
<td>75.5</td>
<td>75.9†</td>
</tr>
<tr>
<td>Health perception (1)</td>
<td>Excellent/very good</td>
<td>57.6</td>
<td>46.3</td>
<td>43.1</td>
<td>36.6</td>
<td>27.9‡</td>
</tr>
<tr>
<td>Physical functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrying groceries (2)</td>
<td>No limitation</td>
<td>66.9</td>
<td>59.2</td>
<td>55.1</td>
<td>50.3</td>
<td>40.6‡</td>
</tr>
<tr>
<td>Climbing stairs (3)</td>
<td>No limitation</td>
<td>50.0</td>
<td>49.5</td>
<td>41.2</td>
<td>40.2</td>
<td>25.0‡</td>
</tr>
<tr>
<td>Walking (4)</td>
<td>No limitation</td>
<td>65.2</td>
<td>58.7</td>
<td>54.4</td>
<td>50.6</td>
<td>30.0‡</td>
</tr>
<tr>
<td>Role limitations (physical) (5)</td>
<td>None at all/a little bit</td>
<td>77.1</td>
<td>71.3</td>
<td>70.3</td>
<td>67.6</td>
<td>58.9</td>
</tr>
<tr>
<td>Bodily pain (6)</td>
<td>None/very mild</td>
<td>68.2</td>
<td>63.5</td>
<td>60.1</td>
<td>54.4</td>
<td>47.5‡</td>
</tr>
<tr>
<td>Energy/fatigue (7)</td>
<td>Had energy</td>
<td>50.1</td>
<td>40.3</td>
<td>37.8</td>
<td>34.0</td>
<td>29.2‡</td>
</tr>
<tr>
<td>Social functioning (SF) (8)</td>
<td>Interfered with SF</td>
<td>88.6</td>
<td>85.5</td>
<td>84.4</td>
<td>81.4</td>
<td>74.5‡</td>
</tr>
<tr>
<td>Role limitations (mental) (9)</td>
<td>None at all/slightly</td>
<td>86.7</td>
<td>83.2</td>
<td>84.3</td>
<td>80.4</td>
<td>78.9‖</td>
</tr>
<tr>
<td>Mental health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling calm (10)</td>
<td>All/most of the time</td>
<td>73.4</td>
<td>65.4</td>
<td>62.1</td>
<td>60.5</td>
<td>58.7‡</td>
</tr>
<tr>
<td>Feeling blue (11)</td>
<td>None/a little of the time</td>
<td>73.7</td>
<td>75.9</td>
<td>73.6</td>
<td>70.1</td>
<td>60.1§</td>
</tr>
<tr>
<td>Being happy (12)</td>
<td>All/most of the time</td>
<td>76.0</td>
<td>70.0</td>
<td>70.9</td>
<td>66.2</td>
<td>59.5§</td>
</tr>
</tbody>
</table>

Abbreviations: HSQ, Health Status Questionnaire; RF, risk factor.

*Prevalences (given as percentages) are adjusted for age in 1996, race (indicator for African American), and baseline education (in years). Results for the first row (“age in 1996”) are unadjusted. See asterisk footnote in Table 1 for definition of baseline risk status.

†The 12 HSQ items and their corresponding domains are: (1) Health perception: In general, would you say your health is . . . ? Physical functioning domain (items 2-4); Does your health now limit you in these activities: (2) lifting or carrying groceries? (3) climbing several flights of stairs? (4) walking several blocks? (5) Role limitations (physical): How much difficulty did you have doing your work or other regular activities as a result of your physical health? (6) Bodily pain: How much bodily pain have you had? (7) Energy/fatigue: How much of the time did you have a lot of energy? (8) Social functioning: To what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups? (9) Role limitations (mental): To what extent have you accomplished less than you would like in your work or other daily activities as a result of emotional problems (such as feeling depressed or anxious)? Mental health domain (items 10-12): How much of the time did you . . . ? (10) have you felt calm and peaceful? (11) have you felt downhearted and blue? (12) have you been a happy person?

‡P < .001 for test of linear trends based on logistic regressions using “risk status” as an ordinal variable with values ranging from 1 to 5.

§P < .01 for test of linear trends based on logistic regressions using “risk status” as an ordinal variable with values ranging from 1 to 5.

¶P < .05 for test of linear trends based on logistic regressions using “risk status” as an ordinal variable with values ranging from 1 to 5.

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Hence, preserving quality of life at older ages has become an increasingly important issue.

To date, little information has emerged on the long-term impact of cardiovascular risk factors and related lifestyle habits measured in youth and middle age on quality of life in older age. The main focus of research has been on physical disability and specific components of functional health status, not on the entire spectrum of quality of life (ie, the subjective sense of well-being encompassing physical, mental, and social aspects of life).

The available longitudinal studies have mostly assessed impact on disability of single risk factors rather than combinations of risk factors. Prior studies also lack low-risk subcohorts of adequate size to use as a benchmark.
Figure 3. Multivariable-adjusted prevalence of self-reported coronary heart disease (CHD), cardiovascular disease (CVD), and any of 22 major diseases at 28-year follow-up by baseline risk status (see asterisk footnote in Table 1 for definition of risk status) for 2692 women and 3650 men 65 years or older. Adjusted for age in 1966, race (indicator for African American), and baseline education (in years). CHD includes myocardial infarction and angina; CVD, CHD, congestive heart failure, stroke, arteriosclerosis, and other heart diseases; and any disease, 6 groups of diseases in CVD, lung cancer, stomach cancer, intestinal cancer, rectal cancer, female cancers (breast cancer, ovarian cancer, and uterine cancer), prostate cancer, leukemia, other cancers excluding skin cancer, diabetes, pneumonia, emphysema, liver disease, kidney disease, Alzheimer disease, hip fracture, and other major diseases. $P<.001$ for linear trend across 5 risk strata for all outcomes for both men and women based on logistic regressions using “risk status” as an ordinal variable with values ranging from 1 to 5. RF indicates risk factor.
follow-up of this and other low-risk groups over enough years to accrue total life experience (ie, follow-up to mortality) for all or most of the people in these cohorts.

Only a small minority of the cohort (<10% of the entire 39,522 participants) met the criteria for low risk at the baseline examination in 1967-1973. Of note, participants with 0 risk factors (ie, nonsmokers with intermediate [but not favorable] levels of serum cholesterol and blood pressure and no minor ECG abnormalities [20.2% of all participants]) also had better outcomes than those with 1 or more high risk factors. Prevalence of low-risk status was similarly low in other cohorts. For example, only about 7% of the Nurses’ Health Study cohort met criteria for low risk defined by lifestyle and dietary factors (nonsmoking, moderate/vigorous exercise ≥30 min/d, BMI [calculated as weight in kilograms divided by the square of height in meters] <25, and a diet score in the top 2 quintiles). Furthermore, only 18% of respondents to a national telephone survey (ages ≥18 years) reported having no major CVD risk factors (but not necessarily favorable levels). Nonetheless, the past few decades saw significant declines not only in CVD mortality and morbidity but also (in the past 2 decades) in chronic disability prevalence rates among older persons in the United States, possibly due to decreasing prevalence of major CVD risk factors and increase in prevalence of low-risk individuals.

One limitation of our study is possible selection bias related to the response rate (approximately 60%) to the questionnaire. Difficulties of long-term follow-up are well documented, especially in studies in which participants have not been contacted for decades, and response rates among nonresponders compared with responders have been similar to ours. In our cohort, there was a graded inverse relation between number of baseline risk factors and response rate, possibly because nonresponders were in poorer current health, hence less motivated or less able to participate. This is consistent with the observation of a higher 4-year postseason mortality rate among nonresponders compared with respondents. Hence, the observed associations between low-risk status and quality of life are almost certainly underestimates (ie, would likely have been stronger had we obtained a better response rate from higher-risk participants). A further limitation is that risk factors were measured at only a single point in time, and changes in the profiles of low-risk persons probably occurred during the 26-year follow-up, which is also likely to bias the results toward the null. Also, although participants with history of MI or diagnosis of diabetes at baseline were excluded, information was not collected to exclude those with other severe chronic conditions at initial examination, which could potentially influence quality of life. Exclusion of persons with history of MI or diabetes at baseline made the associations between midlife risk factors and older age quality of life more conservative. Furthermore, the CHA cohort was derived from employed persons in Chicago; thus, they were healthier than the general population and less likely to have severe chronic diseases at baseline. Finally, the use of participant-reported data on morbidity and medications, the most practical method of assessing disease status in large prospective studies, is also a limitation.

However, recent reports show that self-reported morbidity is superior to data collected by physicians for predicting functional disability. Self-reports of ischemic heart disease were found to be accurate more than 80% of the time.

The findings of our study demonstrate the beneficial effect of low-risk status in middle age for future health-related quality of life, including physical and social functioning and mental health. Current treatments (including drug treatment and lifestyle modifications) to control high blood pressure and serum cholesterol level, while effective, do not typically reduce morbidity and mortality to levels observed in low-risk individuals. Our data imply that primary prevention of major cardiovascular risk factors earlier in life is the key strategy not only to mitigate the epidemic of CHD and CVD in older age but also to improve quality of life with better health status. Although the critical goal of prevention must be to maximize the number of people in the low-risk group, this study also shows a clear gradient for health status in older age with number of risk factors. This implies that there may be substantial benefit in preventing shift to higher risk factor levels. This highlights the importance of comprehensive preventive strategies of simultaneously targeting all major CVD risk factors for achievement of the national goal of increased years of healthy life for older adults.

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REFERENCES
