the levels of smoking and passive smoking exposure were similar to those in 1996 and not improved. Our recent data (submitted for publication) has shown that in never-smoking Chinese, older women had an approximately 50% higher risk of exposure to passive smoking than men. Thus, it is not surprising that we have found a significant relationship between passive smoking exposure and the risk of cognitive impairment in these women.

We did not measure cotinine levels to quantify passive smoking exposure, which is a main limitation of the study. Self-reported passive smoking may underestimate exposure,[7] although it can distinguish relative levels of exposure to passive smoking.[8] Our previous studies[1,9] suggested that the combination of a questionnaire and cotinine levels for measuring passive smoking exposure would increase the statistical power. Therefore the association of passive smoking with dementia in the present study may be more conservative without using cotinine levels for analysis. The findings of this study are unlikely to result from chance or bias. Large prospective studies are required to confirm the causal relationship between passive smoking and cognitive impairment. Nevertheless, more campaigns for smoking cessation and control of smoking in public areas will help reduce the risk of dementia and the encroaching worldwide dementia epidemic.

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Enjoying Life and Living Longer

There is accumulating evidence that positive well-being is associated with reduced mortality and risk of coronary heart disease (CHD) and other diseases of older age.[1-3] To our knowledge, this association has not previously been investigated in a nationally representative sample in which extensive health and behavioral data are available. We therefore used the English Longitudinal Study of Aging (ELSA) to evaluate prospective associations between enjoyment of life and survival.

Methods. The ELSA began in 2002 with 11 391 men and women 50 years and older living in England.[4] Comparisons of the sociodemographic characteristics of participants against results from the national census show that the sample is representative of the English population. Of the core sample, 94.8% consented to data linkage to mortality records. Participants were tracked for a mean of 7 years, 3 months. Complete data on well-being, health behavior, and survival were available from 1251 fatalities and 7774 survivors.

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Table. Enjoyment of Life and Mortality: Complete Sample

Model	Covariates	Enjoyment of Life[e] Quartiles	Adjusted Hazard Ratio (95% CI)	*P* Value
Model 1	Age + sex	1 (lowest)	1 [Reference]	
		2	0.767 (0.663-0.887)	.001
		3	0.591 (0.515-0.678)	.001
		4 (highest)	0.425 (0.346-0.521)	.001
Model 2	Age + sex + demographic factors[a]	1 (lowest)	1 [Reference]	
		2	0.812 (0.702-0.940)	.005
		3	0.658 (0.573-0.757)	.001
		4 (highest)	0.498 (0.405-0.613)	.001
Model 3	Age + sex + demographic factors[a] + health indicators[b]	1 (lowest)	1 [Reference]	
		2	0.888 (0.766-1.030)	.11
		3	0.756 (0.655-0.873)	.001
		4 (highest)	0.636 (0.512-0.791)	.001
Model 4	Age + sex + demographic factors[a] + health indicators[b] + depression[c]	1 (lowest)	1 [Reference]	
		2	0.907 (0.781-1.054)	.20
		3	0.783 (0.675-0.909)	.001
		4 (highest)	0.661 (0.530-0.824)	.001
Model 5	Age + sex + demographic factors[a] + health indicators[b] + depression[c] + health behaviors[d]	1 (lowest)	1 [Reference]	
		2	0.932 (0.802-1.082)	.36
		3	0.830 (0.715-0.964)	.02
		4 (highest)	0.717 (0.575-0.895)	.003

[a] Demographic factors: wealth, education, ethnicity, marital status, and employment status.
[b] Health indicators: limiting longstanding illness, cancer, coronary heart disease, stroke, diabetes, heart failure, and chronic lung disease.
[c] History of depressive illness and elevated Center for Epidemiological Studies Depression Scale score.
[d] Health behaviors: smoking, physical activity, and alcohol intake.
[e] The reference group is lowest enjoyment of life group: 515 of 2525 in the lowest, 282 of 1792 in the second, 339 of 2923 in the third, and 115 of 1785 in the highest enjoyment group.

Enjoyment of life was assessed with the pleasure subscale from the CASP-19 (Control, Autonomy, Self-realisation and Pleasure)[5] and depression with the Center for Epidemiologic Studies Depression (CES-D) Scale. Socioeconomic status was indexed by total household wealth. Education, marital status, employment, smoking, physical activity, and alcohol consumption were also recorded. Participants were asked if they experienced limiting long-standing illnesses and whether they had been diagnosed as having clinical depression, CHD, cancer, diabetes, stroke, heart failure, and chronic lung disease.

The sample was divided by into quartiles of enjoyment of life. Cox proportional hazards regression models were used, testing models that successively adjusted for age and sex, demographic factors, health indicators, depression, and health behaviors. Similar results were obtained when enjoyment was modeled as a continuous variable.

Results. Participants in the higher enjoyment group were, on average, younger and more likely to be female, married, better educated, and wealthier than those with lower enjoyment scores (eTable 1). They had lower depression scores and fewer illnesses, were less likely to be smokers, and were more likely to be physically active. The proportion of people who died over the follow-up period was 20.4% in the lowest enjoyment quartile, 15.7% in the second, 11.6% in the third, and 6.4% in the highest enjoyment quartile. Compared with the lowest enjoyment group, the age- and sex-adjusted hazard ratio was reduced for all other quartiles in a dose-dependent fashion, so participants in the highest enjoyment quartile had a 57.5% reduced risk of death (**Table**). This was attenuated when demographic factors, baseline health, depression, and health behaviors were taken into account, but in the full model, the highest enjoyment group still showed a hazard ratio of 0.717. Other factors independently associated with mortality are detailed in eTable 2.

As a guard against pre-existing illness leading both to diminished enjoyment of life and premature mortality, an additional analysis was conducted excluding individuals who died within 2 years of the baseline assessments. In this subgroup, death rates were 16.4%, 13.2%, 9.7%, and 5.4% in the lowest to highest enjoyment quartiles, and the proportional hazards regression models were similar to those for the full sample (eTable 3).

Comment. Subjective well-being is a central societal aspiration. This study indicates that one aspect of well-being—enjoyment of life—is associated with longer survival in a dose-dependent fashion. One danger in the investigation of positive well-being is that findings simply reflect the adverse effects of depression and other negative states.[6] However, a substantial protective effect of enjoyment remained after controlling for depression, suggesting that positive affect has independent associations with health outcomes.

Greater enjoyment of life was associated with less prevalent illness, greater wealth and education, being married, and being in paid employment, all of which have established links with survival. These factors accounted for approximately one-third of the protective effect of en-

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joyment in the present analyses. But greater enjoyment was associated with a 28% lower risk of death even after these factors, as well as depression and health behaviors, had been taken into account.

Other factors may be responsible for the remaining association between enjoyment and survival. It may be caused by unmeasured confounding factors such as other pre-existing illnesses. Only 3 health behaviors were assessed, and other aspects such as diet may be relevant. In addition, direct links with health outcomes are plausible, since biological responses such as reduced cortisol output in everyday life and attenuated cardiovascular and inflammatory responses to stress are related to positive well-being.[7]

The results of this study do not establish that enjoyment of life is causally related to survival. Enjoyment may be a marker of underlying health-related biological, behavioral, or dispositional factors that are responsible for the association. Nonetheless, our findings show that the link between enjoyment and survival at older ages is not fully accounted for by demographic factors or major pre-existing illnesses. These results highlight the importance of positive well-being in older adults and suggest that efforts to improve enjoyment of life, as well to manage and prevent disease, could have beneficial effects on life expectancy.

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Online-Only Material: eTables 1-3 are available at http://www.archinternmed.com.
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Healthy Eating Index and Mortality in a Nationally Representative Elderly Cohort

The Healthy Eating Index (HEI) is a tool developed by the US Department of Agriculture's Center for Nutrition Policy and Promotion in 1995 for evaluating diet quality and monitoring changes in dietary practices in the US population.[1] Prior studies have demonstrated an association between a "good" HEI score and lower incidence of cardiovascular disease[2,3] and accompanying risk factors.[4,5] However, literature on the prognostic utility of HEI in an exclusively geriatric population is sparse. We sought to investigate whether there is a correlation between favorable HEI scores and all-cause as well as cardiovascular mortality in the elderly US population.

Methods. The public access data set of the Third National Health and Nutrition Examination Survey between the years 1988 and 1994 (n=33 994) was analyzed, and a total of 3884 patients aged 65 years or older with HEI data were included in our study.

The HEI comprises 10 dietary components that measure diet quality. The original scoring system totals 100 points (optimal diet) and gives equal weight to all 10 components (0-10 each). The HEI accounts for age and sex when creating the index scores based on serving sizes. Details of the HEI score are available at ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/nhanes/nhanes3/6A/hei-acc.pdf. Our study population was stratified into 3 categories according to HEI scores (>80 indicates a "good" diet; 51-80, a diet that "needed improvement" [fair]; and <51, a "poor" diet).[6,7] Mortality data up to December 31, 2006, were analyzed using national linkage records and death certificates (mean [SD] follow-up, 161.6 [48] person-months). Cardiovascular causes of mortality were identified using the *International Statistical Classification of Diseases, 10th Revision* codes. Univariate and multivariate Cox proportional regression analyses were carried out to calculate the hazard ratios (HRs) using all-cause mortality and cardiovascular death as the dependent variables. Baseline age, sex, diabetes, myocardial infarction, congestive heart failure, stroke, hypertension, race, body mass index, total cholesterol level, poverty to income ra-

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