Health Disadvantage in US Adults Aged 50 to 74 Years: A Comparison of the Health of Rich and Poor Americans With That of Europeans

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Objectives. We compared the health of older US, English, and other European adults, stratified by wealth.

Methods. Representative samples of adults aged 50 to 74 years were interviewed in 2004 in 10 European countries (n=17481), England (n=6527), and the United States (n=9940). We calculated prevalence rates of 6 chronic diseases and functional limitations.

Results. American adults reported worse health than did English or European adults. Eighteen percent of Americans reported heart disease, compared with 12% of English and 11% of Europeans. At all wealth levels, Americans were less healthy than were Europeans, but differences were more marked among the poor. Health disparities by wealth were significantly smaller in Europe than in the United States and England. Odds ratios of heart disease in a comparison of the top and bottom wealth tertiles were 1.94 (95% confidence interval [CI]=1.69, 2.24) in the United States, 2.13 (95% CI=1.73, 2.62) in England, and 1.38 (95% CI=1.23, 1.56) in Europe. Smoking, obesity, physical activity levels, and alcohol consumption explained a fraction of health variations.

Conclusions. American adults are less healthy than Europeans at all wealth levels. The poorest Americans experience the greatest disadvantage relative to Europeans. (*Am J Public Health.* 2009;99:540–548. doi:10.2105/AJPH.2008.139469)

The United States spends 2 to 3 times more than European countries on medical care per capita.[1,2] However, recent research indicates that US adults aged 55 to 64 years are less healthy than their English counterparts at all socioeconomic levels.[3,4] Less is known about how the health of adults in the United States and England compares with the health of other Europeans across the socioeconomic spectrum. Including other European countries in the analysis and examining the socioeconomic gradients within and between each region can shed light on possible explanations for between-country health differences.

Several factors may explain why Americans have worse health than Europeans.[3–8] Although major risk factors such as smoking are similarly prevalent,[3] the obesity epidemic is more advanced in the United States than in Europe.[9] In addition, Europe's social and healthcare policies are more comprehensive and contrast with less accessible US programs.[4,10] Most notably, whereas healthcare access is universal in Europe, about 41 million Americans remain uninsured.[11] Furthermore, most European health care systems have a strong focus on primary care, which contrasts with a marked focus on specialist care in the United States.[12–14]

Socioeconomic inequalities may be critical to understanding why Americans have worse health than Europeans.[3,5] European welfare policies may protect the health of poor Europeans—for example, through universal medical care, comprehensive primary care, and unemployment protection programs.[5,12,14] If safety net policies drive the US–Europe health gap, then we expect that poor Americans would report worse health than would poor Europeans but that wealthy Americans and wealthy Europeans would report equivalent health. Furthermore, we expected poverty to be associated with a smaller health disadvantage in European countries than in the United States.

We used comparable surveys in the United States, England, and 10 other European countries to examine cross-country health variations by wealth and investigated how wealth–health associations differ among regions.

METHODS

We drew data from the 2004 wave of the US Health and Retirement Survey (HRS); the 2004 Survey of Health, Ageing and Retirement in Europe (SHARE); and the 2004 English Longitudinal Study of Ageing (ELSA). These surveys were designed to provide comparable information across countries. Details on each survey are provided elsewhere.[15–19] Representative samples of noninstitutionalized adults aged 50 years and older in each country were interviewed with structured computerized questionnaires. The SHARE and ELSA interviews were conducted in the household. The HRS interviews were conducted primarily by phone. Comparable questionnaires were applied in each country by using HRS questions as models for translation in Europe. The sample was restricted to participants aged 50 to 74 years because we expected wealth to be particularly important at middle and early old age.

The HRS is based on a representative sample of US adults 50 years and older.[15–17] The HRS began in 1991, and new cohorts have been added to maintain population representation. The 2004 HRS wave included 14223 respondents aged 50 to 74 years (response rate=87.8%). To explore cross-country differences beyond those attributable to US racial/ethnic health disparities, we restricted HRS data to non-Hispanic Whites (n=10205). However, we also performed sensitivity analyses that included US racial minorities. We excluded participants without valid sampling weights (n=200) or with missing health outcomes (n=65), for a final sample of 9940.

The ELSA survey comprises a representative sample of the English population aged 50 years and older interviewed biennially since 2002.[19] The 2004 survey included 6905 respondents aged 52 to 74 years (response rate=82%). We excluded respondents who were missing data on wealth (n=111), health outcomes (n=45), or sampling weights (n=222), for a final sample of 6527.

The SHARE data were based on representative samples drawn from population registries or from multistage sampling in Sweden, Denmark, Germany, the Netherlands, France, Switzerland, Austria, Italy, Spain, and Greece.[18] The average household response rate was 61.6%, ranging from 39% (Switzerland) to 81% (France). From 17 815 participants aged 50 to 74 years, we excluded individuals who were missing data on wealth (n=13), health outcomes (n=273), or sampling weights (n=48). The final sample was comprised of 17 481 participants.

Wealth, Income, and Education Measurements

We operationalized wealth as household total net worth: the sum of all financial (net stock value, mutual funds, bonds, and savings) and housing wealth (value of primary residence net of mortgage, other real estate value, own business share, and owned cars) minus liabilities. Missing items were imputed with hot-decking procedures, whereby a missing value is replaced by a value randomly selected from an appropriately formed donor pool.[18–20] To account for differences in the number of household members, we divided wealth by the square root of household size.[21,22] We adjusted wealth for purchasing power parity and converted US dollars to EU euros (€1.00=US$1.24) in all countries. For some analyses, we collapsed wealth into country-specific tertiles.

We classified education into 3 categories: in Europe, these corresponded approximately to the International Standard Classification of Education levels 0 to 2 (lower secondary school or lower), 3 (upper secondary school), and 4 to 6 (postsecondary). In the United States, education categories were high school or less (0 to 12 years of schooling), more than high school but not a college graduate (13 to 15 years), and college graduate or more (≥16 years). We chose these classifications because they yielded similar educational distributions in Europe and the United States. However, applying International Standard Classification of Education classifications both in Europe and the United States did not alter our results.

Outcome Measurements

We examined health outcomes or conditions assessed with comparable questionnaire items across surveys: chronic diseases, measured by self-reported doctor's diagnosis of heart disease, stroke, hypertension, diabetes or high blood sugar, cancer (excluding skin cancer), and lung disease and disability, measured in 2 ways—limitations on 1 or more of 6 instrumental activities of daily living and 1 or more limitations on 10 mobility and fine-motor control items (mobility).[23]

Risk Factors

We categorized smoking as current, former, or never. We categorized alcohol-drinking frequency as drinking any alcoholic beverage daily or almost daily, 5 to 6 days per week, 3 to 4 days per week, 1 to 2 days per week, or less than 1 or 2 days per month. We dichotomized alcohol-drinking intensity based on drinking more than 2 drinks 5 to 6 days per week in HRS and SHARE. In ELSA, questions referred to the past week; therefore, we dichotomized alcohol-drinking intensity based on drinking more than 2 drinks per day combined with drinking 5 to 7 days in the past week. We dichotomized physical activity based on participation in vigorous activities (e.g., sports, heavy housework) more than 1 day per week. We defined body mass index as weight in kilograms divided by height in meters squared. Weight and height were self-reported in HRS and SHARE but measured in ELSA.

Data Analysis

We initially analyzed men and women separately but pooled results because estimates did not differ by gender. We analyzed data in 5 steps. First, we used logistic regression to model the prevalence of conditions in the United States, England, and Europe, and we adjusted for age and gender, taking the US distributions as standard. Second, we fit smooth nonparametric LOESS function curves to examine health across the distribution of wealth in each region.[24] LOESS is a locally weighted regression smoother that fits multiple lines to small parts of the wealth axis and combines their central parts. For clarity, in the figures, we used wealth from −€100 000 to €1 000 000, which comprised 95% of each region's population. Third, to quantify this relation, we fit splines with 3 knots that separated linear segments along which the association between wealth and health was approximately linear. The spline model provides odds ratios (ORs) of each health outcome per €100 000 increase in wealth separately for 4 wealth segments: less than €0; €0 to less than €199 999; €200 000 to €399 999; and €400 000 or more. Because few individuals reported negative wealth, we only tabulated results for the 3 positive wealth segments. In these models, we considered absolute wealth.

Fourth, we used logistic regression to model prevalence of health outcomes by wealth tertiles to assess wealth relative to countrymen, and tested for differences among England, Europe, and the United States. These models were adjusted for age, gender, and country (in Europe) or region (in the United States: Northeast, Midwest, South, West, or unknown). Coefficients were allowed to differ among countries through interaction terms. Finally, to assess the role of risk factors in explaining health disparities, we modeled the prevalence of health outcomes by wealth tertile, and adjusted for demographics, educational level, and risk factors.

Analyses were performed with appropriate sampling weights in SAS version 8.2 (SAS Institute Inc, Cary, NC) or S-plus version 6.0 (Insightful Corp, Seattle, WA).

RESULTS

Basic sample characteristics are available as a supplement to the online version of this article (available at http://www.ajph.org). Age and gender distributions were similar across populations. A large proportion (52.5%) of participants reported at least 1 diagnosed chronic disease.

Figure 1 shows that prevalence of each health condition was higher in the United States than in England or in other European countries. After we adjusted for age and gender, 18% of US adults reported heart disease, compared with 12% in England and 11% in Europe. In the United States, 11% of adults

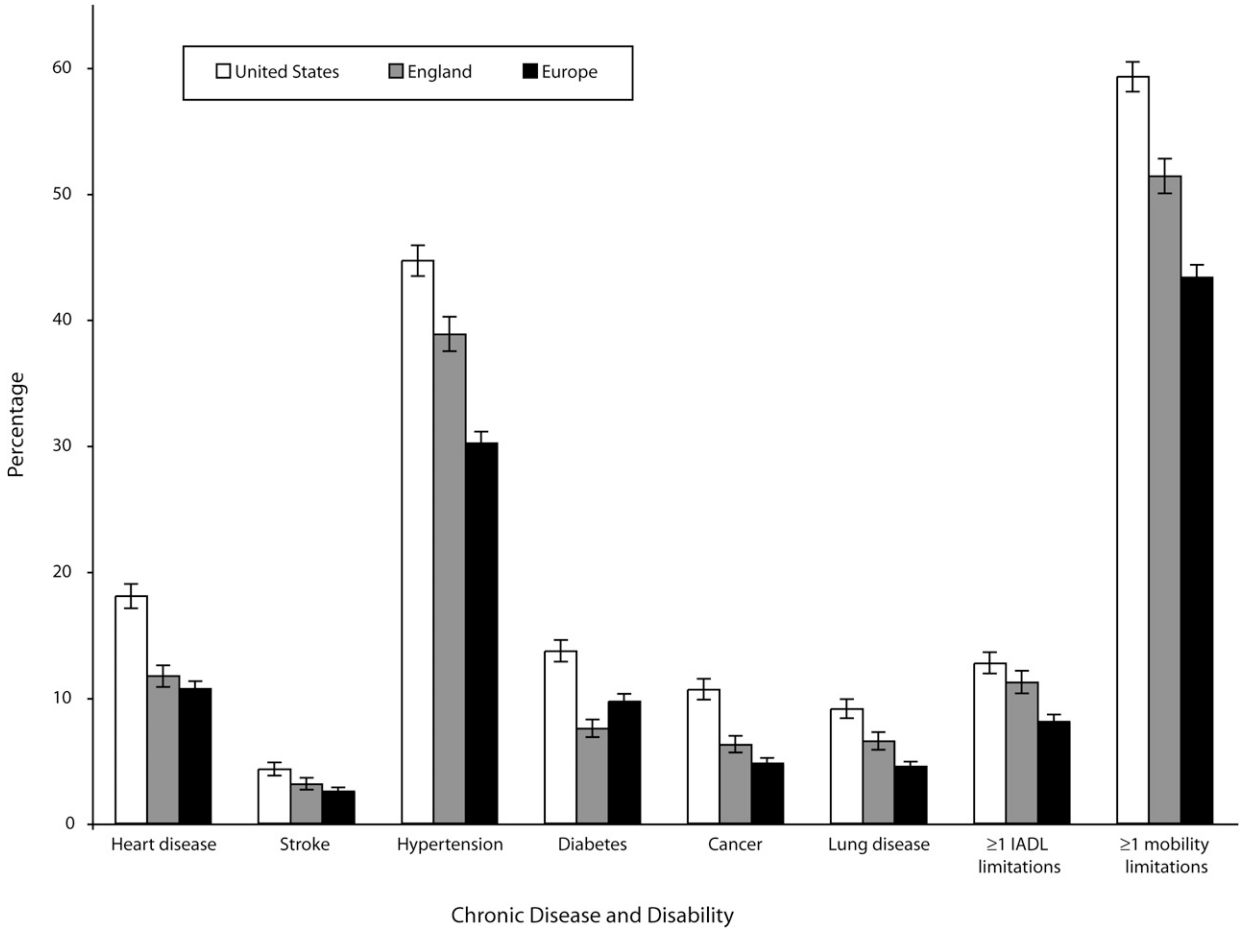
reported having had cancer, compared with 6% in England and 5% in Europe. Mobility limitations were reported in 59% of US adults, compared with 50% in England and 43% in Europe. Similar patterns were observed for other health outcomes.

Health Disparities by Absolute Wealth

Figure 2 shows predicted health by wealth with adjusted LOESS regression curves. In most cases, the US line never crosses either the English or European lines, indicating that US adults reported worse health than English or other Europeans at every wealth level. Some Americans achieved the same level of health as Europeans but only at very high wealth levels. For example, the risk of reporting heart disease for a European with €3000 was 11%, which was equivalent to the risk for an American with €300 000.

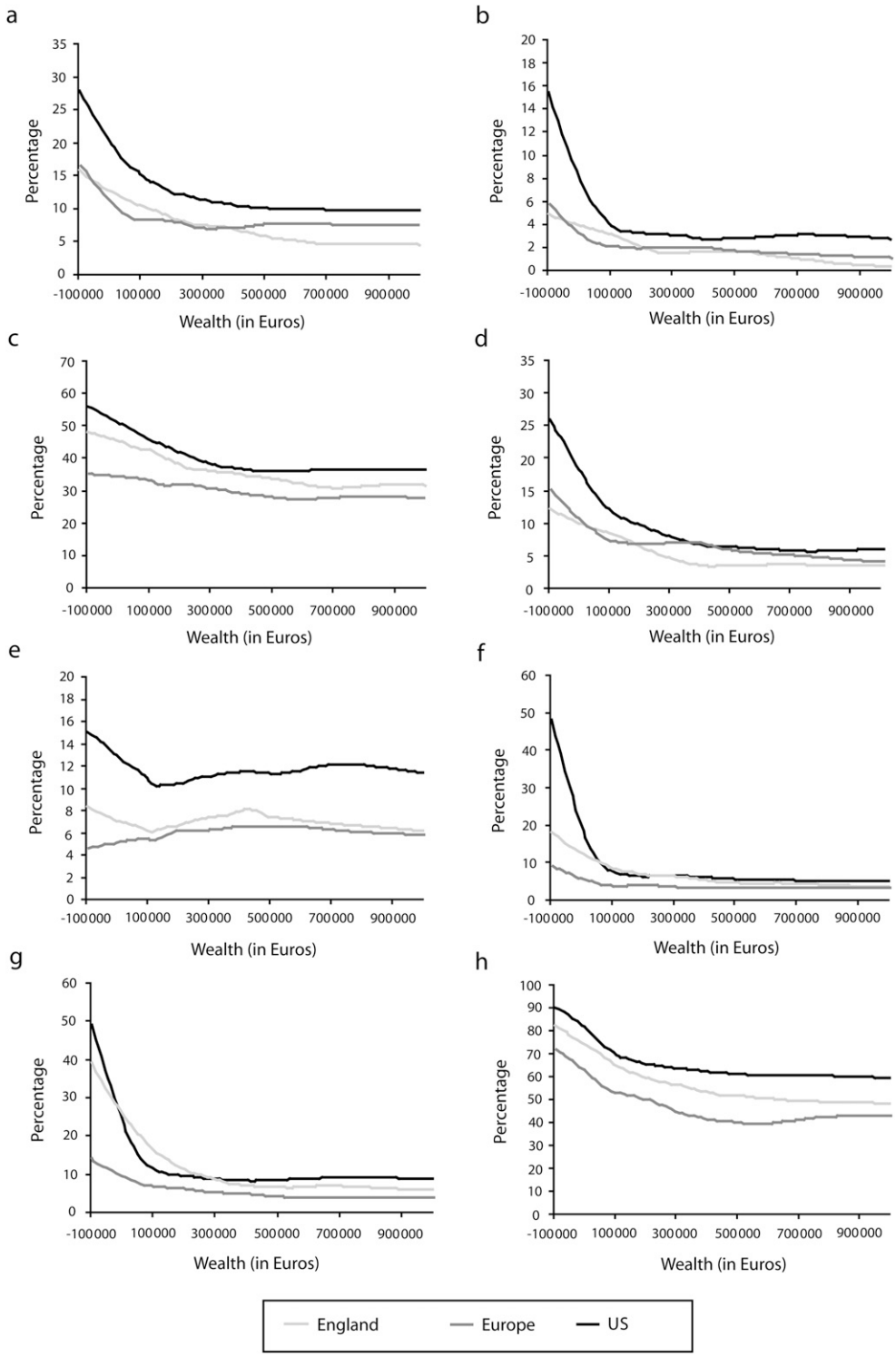
Except for cancer, higher wealth predicted better health in all 3 populations. Curves were much steeper at lower wealth levels, at which point they were steeper in the United States than in Europe. The health disadvantage of Americans was greatest at the bottom of the wealth distribution and diminished with increasing wealth. In supplementary analyses, we investigated LOESS models by country-specific percentile of wealth, rather than absolute wealth in euros, to ameliorate bias from imperfect cross-national wealth purchasing parity adjustments. Key findings were nearly identical (see Supplementary Figure 1, available as a supplement to the online version of this article at http://www.ajph.org).

Table 1 presents ORs from segmented spline models, showing that gradients are steepest at low levels of wealth. For instance, among Americans with wealth €0 to €199 999, each €100 000 wealth increment was associated with a 24% reduction in odds of heart disease (OR=0.76; 95% confidence interval [CI]= 0.69, 0.84). At wealth between €200 000 and €399 999, wealth increments of €100 000 were associated with reductions in the odds of heart disease of about 12%. At wealth €400 000 or higher, increasing wealth did not predict heart disease. Patterns were similar



Notes. HRS = Health and Retirement Survey; ELSA = English Longitudinal Study of Ageing; SHARE = Survey of Health, Ageing and Retirement in Europe; IADL = instrumental activities of daily living. Model adjusted for age and gender; lines indicate 95% confidence intervals.

FIGURE 1—Prevalence of chronic disease and disability among men and women aged 50 to 74 years in the United States, England, and Europe: HRS, United States, 2004; ELSA, England, 2004; and SHARE, Europe, 2004.



Notes. HRS = US Health and Retirement Survey; ELSA = English Longitudinal Study of Ageing; SHARE = Survey of Health, Ageing and Retirement in Europe; IADL = instrumental activities of daily living. Models adjusted for age, gender, and educational level. Wealth values are in euros (€1.00 = US$1.24) and were adjusted by purchasing power parity.

FIGURE 2—LOESS function of chronic disease and disability by wealth among men and women aged 50 to 74 years in the United States, England, and Europe, for (a) heart disease, (b) stroke, (c) hypertension, (d) diabetes, (e) cancer, (f) lung disease, (g) 1 or more IADL limitation, and (h) 1 or more mobility limitation: HRS, United States, 2004; ELSA, England, 2004; and SHARE, Europe, 2004.

TABLE 1—Odds Ratios (ORs) per €100 000 Wealth Increase for Chronic Disease and Disability Among Men and Women Aged 50 to 74 Years, by Wealth Category and Region: HRS, United States, 2004; ELSA, England, 2004; and SHARE, Europe, 2004

Wealth (Thousands of €)	United States, OR (95% CI)	England, OR (95% CI)	Europe,[a] OR (95% CI)
	Heart disease		
€0-€199	0.76 (0.69, 0.84)	0.81 (0.72, 0.92)	0.82 (0.76, 0.89)
€200-€399	0.88 (0.79, 0.98)	0.81 (0.70, 0.92)	0.99 (0.91, 1.09)
≥€400	1.02 (0.99, 1.04)	0.98 (0.93, 1.03)	0.99 (0.97, 1.01)
	Stroke		
€0-€199	0.58 (0.48, 0.70)	0.67 (0.54, 0.82)	0.71 (0.61, 0.83)
€200-€399	1.00 (0.80, 1.24)	0.92 (0.70, 1.21)	1.03 (0.84, 1.25)
≥€400	1.02 (0.97, 1.08)	0.77 (0.62, 0.96)	0.95 (0.90, 1.01)
	Hypertension		
€0-€199	0.83 (0.77, 0.90)	0.86 (0.79, 0.94)	0.94 (0.89, 0.99)
€200-€399	0.88 (0.81, 0.96)	0.91 (0.84, 1.00)	0.93 (0.87, 0.99)
≥€400	1.00 (0.98, 1.02)	0.99 (0.96, 1.02)	0.99 (0.98, 1.00)
	Diabetes		
€0-€199	0.66 (0.60, 0.74)	0.82 (0.71, 0.95)	0.74 (0.68, 0.80)
€200-€399	0.80 (0.70, 0.91)	0.74 (0.62, 0.88)	0.98 (0.88, 1.08)
≥€400	1.02 (0.99, 1.05)	0.98 (0.92, 1.05)	0.99 (0.98, 1.01)
	Cancer		
€0-€199	0.87 (0.77, 0.98)	1.00 (0.84, 1.19)	1.09 (0.97, 1.22)
€200-€399	1.10 (0.97, 1.24)	1.13 (0.96, 1.33)	1.05 (0.93, 1.19)
≥€400	1.01 (0.99, 1.04)	0.96 (0.90, 1.01)	0.96 (0.93 ,0.99)
	Lung disease		
€0-€199	0.45 (0.39, 0.52)	0.72 (0.62, 0.84)	0.79 (0.70, 0.88)
€200-€399	1.25 (1.06, 1.48)	0.84 (0.70, 1.01)	0.94 (0.81, 1.08)
≥€400	0.96 (0.91, 1.01)	0.99 (0.93, 1.06)	1.01 (0.99, 1.03)
	≥1 IADL limitations		
€0-€199	0.51 (0.46, 0.58)	0.60 (0.53, 0.68)	0.75 (0.69, 0.82)
€200-€399	1.13 (0.98, 1.31)	0.79 (0.67, 0.92)	0.82 (0.73, 0.92)
≥€400	0.98 (0.94, 1.02)	0.97 (0.92, 1.03)	1.02 (1.00, 1.03)
	≥1 mobility limitations		
€0-€199	0.67 (0.62, 0.72)	0.71 (0.65, 0.78)	0.79 (0.75, 0.83)
€200-€399	0.97 (0.90, 1.05)	0.88 (0.81, 0.96)	0.85 (0.80, 0.90)
≥€400	0.99 (0.97, 1.01)	0.97 (0.95, 1.00)	1.01 (1.00. 1.01)

Notes. HRS = Health and Retirement Survey; ELSA = English Longitudinal Study of Ageing; SHARE = Survey of Health, Ageing and Retirement in Europe; IADL = instrumental activities of daily living; CI = confidence interval. Models were adjusted for age, gender, educational level, and US region or European country; calculations excluded the highest and lowest 1%. Coefficients are from 2-knot spline models to allow a flexible slope of the relation between wealth and health. Each odds ratio refers to the estimated association between a €100 000 increment in wealth for adults in the region in the specified wealth category and odds of the condition for those adults. Net worth values are in euros (€1.00 = US$1.24) and were adjusted by purchasing power parity.

[a]Participating countries were Sweden, Denmark, Germany, the Netherlands, France, Switzerland, Austria, Italy, Spain, and Greece.

for every condition, except cancer. Although CIs usually overlapped, the ORs in the lowest wealth group (€0 to €199 999) were more extreme in the United States than in England or Europe.

Health Disparities Across Wealth Tertiles

Americans reported worse health than English and European adults in all 3 wealth tertiles, but the US disadvantage was most substantial in the lowest tertile. For instance, after we adjusted for demographics, 22% of US adults in the bottom wealth tertile reported heart disease, compared with 17% in the bottom tertile England and 13% in the bottom tertile in Europe (see Supplementary Figure 2, available as a supplement to the online version of this article at http://www.ajph.org).

Table 2 (left panel) shows that differences in nearly every outcome between top and bottom wealth tertiles were similar in England and the United States, but significantly smaller in the rest of Europe. Except for cancer, the prevalence of chronic diseases and functional limitations increased with decreasing wealth tertile in all countries. Within Europe, health differences by wealth tertile tended to be smaller in the southern or Mediterranean countries, Austria, and Switzerland, and relatively large in the Scandinavian countries, Germany, the Netherlands, and France. However, even in the latter populations, health disparities by wealth were generally smaller than in the United States and England (supplemental figure available at http://www.ajph.org).

Incorporating Risk Factors

In each population, lower wealth was associated with higher smoking prevalence, higher body mass index, less physical activity, and lower alcohol consumption (results not shown). Within each region, adjusting for these risk factors attenuated ORs for comparisons of low to high wealth tertiles by about a third (Table 2, left panel). For instance, when we controlled for risk factors, Americans in the bottom wealth tertile had higher odds of reporting heart disease compared with Americans in the top tertile (OR=1.68; 95% CI=1.45, 1.94); corresponding ORs were 1.83 (95% CI=1.48, 2.27) for England and 1.25 (95% CI=1.11, 1.42) for Europe.

Adults in the United States and England had higher prevalence of obesity and physical inactivity than Europeans, but the latter had higher current smoking prevalence (see table available as a supplement to the online version of this article at http://www.ajph.org). Prevalence of ever smoking was lowest in Europe, but this was largely explained by low ever-smoking rates in women (results not shown). Excessive alcohol use was more prevalent in Europe than in the United States. Adjusting for risk factors only modestly attenuated the

TABLE 2—Adjusted Odds Ratios (ORs) of Chronic Disease and Disability Across Wealth Tertiles and Regions Among Men and Women Aged 50 to 74 Years: 2004

	Across Wealth Tertiles: Low vs High			Across Regions: United States vs Other		
Model	United States, OR (95% CI)	England, OR (95% CI)	Europe,[a] OR (95% CI)	United States, OR (95% CI)	England, OR (95% CI)	Europe,[a] OR (95% CI)
			Heart disease			
Basic Model	1.94 (1.69, 2.24)	2.13 (1.73, 2.62)	1.38 (1.23, 1.56)	1.00 (Ref)	0.58 (0.53, 0.64)	0.52 (0.48, 0.56)
Adjusted Model	1.68 (1.45, 1.94)	1.83 (1.48, 2.27)	1.25 (1.11, 1.42)	1.00 (Ref)	0.58 (0.53, 0.65)	0.63 (0.58, 0.68)
			Stroke			
Basic Model	2.53 (1.94, 3.30)	2.69 (1.83, 3.96)	1.60 (1.28, 2.02)	1.00 (Ref)	0.71 (0.60, 0.85)	0.57 (0.49, 0.65)
Adjusted Model	1.90 (1.44, 2.49)	2.08 (1.40, 3.10)	1.36 (1.08, 1.72)	1.00 (Ref)	0.65 (0.54, 0.79)	0.71 (0.62, 0.82)
			Hypertension			
Basic Model	1.68 (1.51, 1.87)	1.54 (1.35, 1.76)	1.17 (1.07, 1.27)	1.00 (Ref)	0.78 (0.73, 0.84)	0.52 (0.49, 0.54)
Adjusted Model	1.38 (1.23, 1.55)	1.41 (1.22, 1.62)	1.08 (0.99, 1.18)	1.00 (Ref)	0.71 (0.66, 0.77)	0.58 (0.55, 0.61)
			Diabetes			
Basic Model	2.66 (2.26, 3.13)	2.64 (2.04, 3.42)	1.72 (1.52, 1.96)	1.00 (Ref)	0.52 (0.47, 0.58)	0.66 (0.61, 0.72)
Adjusted Model	1.78 (1.51, 2.12)	1.97 (1.50, 2.58)	1.48 (1.30, 1.69)	1.00 (Ref)	0.49 (0.43, 0.55)	0.90 (0.83, 0.98)
			Cancer			
Basic Model	1.07 (0.91, 1.27)	0.88 (0.68, 1.14)	0.86 (0.73, 1.03)	1.00 (Ref)	0.54 (0.48, 0.61)	0.42 (0.38, 0.46)
Adjusted Model	1.03 (0.87, 1.23)	0.86 (0.66, 1.12)	0.85 (0.71, 1.01)	1.00 (Ref)	0.55 (0.48, 0.63)	0.45 (0.41, 0.50)
			Lung disease			
Basic Model	3.33 (2.74, 4.05)	2.41 (1.83, 3.18)	1.63 (1.36, 1.95)	1.00 (Ref)	0.70 (0.62, 0.79)	0.45 (0.41, 0.50)
Adjusted Model	2.49 (2.02, 3.05)	1.89 (1.41, 2.52)	1.42 (1.18, 1.70)	1.00 (Ref)	0.68 (0.60, 0.78)	0.54 (0.49, 0.60)
			≥1 IADL limitations			
Basic Model	2.72 (2.31, 3.22)	3.99 (3.16, 5.03)	2.05 (1.78, 2.37)	1.00 (Ref)	0.86 (0.78, 0.95)	0.58 (0.53, 0.63)
Adjusted Model	2.11 (1.78, 2.51)	3.04 (2.39, 3.87)	1.81 (1.57, 2.10)	1.00 (Ref)	0.80 (0.71, 0.89)	0.69 (0.63, 0.75)
			≥1 mobility limitations			
Basic Model	2.31 (2.06, 2.58)	2.30 (2.01, 2.63)	1.86 (1.72, 2.02)	1.00 (Ref)	0.70 (0.66, 0.75)	0.48 (0.45, 0.50)
Adjusted Model	1.70 (1.51, 1.91)	1.72 (1.49, 1.99)	1.62 (1.49, 1.76)	1.00 (Ref)	0.63 (0.59, 0.68)	0.58 (0.55, 0.62)

Notes. HRS = Health and Retirement Survey; ELSA = English Longitudinal Study of Ageing; SHARE = Survey of Health, Ageing and Retirement in Europe; IADL = instrumental activities of daily living; CI = confidence interval. ORs in the left panel compare odds of disease among individuals in the lowest wealth tertile to odds of disease among countrymen in the highest wealth tertile (reference category). ORs in the right panel compare odds of disease in England or Europe to odds of disease among Americans (reference category). Basic models were adjusted for age, gender, educational level, and US region or European country. Adjusted model included the covariates from the basic model plus smoking, alcohol consumption, body mass index, and physical activity level.
[a]Participating countries were Sweden, Denmark, Germany, the Netherlands, France, Switzerland, Austria, Italy, Spain, and Greece.

American health disadvantage for any health outcome (Table 2, right panel). For example, Europeans had lower odds of reporting heart disease than Americans in both unadjusted (OR=0.52; 95% CI=0.48, 0.56) and adjusted models (OR=0.63; 95% CI=0.58, 0.68).

DISCUSSION

In this international study, we found that US adults of all wealth levels reported worse health than did Europeans at comparable wealth levels. Poor Americans were at particularly worse health compared with their English or other European counterparts, but even well-off Americans reported health comparable to substantially poorer Europeans. Differences in behavioral risk factors accounted for only a fraction of these disparities.

Explaining Health Disparities

Our results show that US adults of all socioeconomic levels report worse health than do English or other European adults.[3,4] Notwithstanding possible limitations, several substantial explanations should be considered: survival advantages among US adults with chronic illness, behavioral differences, differences in the health care system, or social policy contexts other than medical care that indirectly impair American health. Our results shed light on the plausibility of several of these.

Higher disease prevalence may stem from higher survival rates in the United States than in Europe.[5–7] Compared with the European approach, the American medical system might be more focused on ameliorating the consequences of disease, with relatively less attention given to prevention.[2] A combination of lower disease incidence in Europe but higher survival rates in the United States might partly explain our results, but is unlikely to explain discrepancies this large, especially in those younger than 60 years.

Risk factors played a modest role in explaining cross-national health variations. On average, current smoking is higher in Europeans than in Americans, but prevalence of ever smoking is higher among Americans.

Obesity prevalence in the United States was higher than in most European countries, yet these factors did not explain cross-national health variations. In part, this may arise from our use of only current measures of obesity instead of life-course measures of accumulated exposure from early life to adulthood.[25–28] Furthermore, other risk factors that we did not examine, such as dietary intake,[29] blood lipid levels,[3] and hormonal replacement therapy,[30] may also have contributed to health disparities across countries.

The policies in Europe, which are more generous and egalitarian when compared to those in the United States, may improve health outcomes and reduce health disparities.[31,32] Compared with the United States, many European countries have a higher provision of social transfers (e.g., social retirement benefits, unemployment compensation, sick pay) and higher levels of public health expenditures.[1,33] In addition, the social policy contexts in the United States and Europe differ substantially in other areas such as working conditions, transportation options, and housing policies. Although there is limited evidence as yet on the causal effect of these contextual factors,[34–36] the pervasive health disadvantage of Americans even among the very wealthy suggests that some of these factors may indeed detrimentally influence health.

Features of the US health care system may contribute to the worse health of Americans compared with Europeans.[37] In particular, most European countries have a stronger primary care orientation than does the United States.[12–14] Previous evidence suggests that a strong primary care system is associated with better health outcomes,[14,37,38] partly because it entails a stronger focus on primary prevention,[39] a more equitable distribution of resources,[12] and a higher efficacy of the health system.[38] Thus, part of the US health disadvantage may be explained by a weak focus on primary care compared with most European health systems.[12,14,37,40] However, the fact that even wealthy Americans had worse health than their European counterparts suggests that cross-national disparities may not be fully attributable to health care.

Wealth may influence health through different mechanisms in the United States and Europe. Lower wealth limits access to care, particularly among uninsured or partially insured Americans,[11] whereas in Europe medical care is accessible to all. Furthermore, a stronger primary care orientation in Europe may lead to smaller health disparities than are found in the United States.[10,12,37,41] However, the fact that health disparities were relatively large in England as well suggests that mechanisms outside the health care system may also be involved. Wealth enhances access to material resources such as housing, and is a source of immediate consumption in periods of economic strain.[42] Wealth may also increase sense of control over life and other psychosocial resources that can enhance health.[43,44] Examining whether these pathways operate differently in the United States and Europe is an important subject for further research.

Differences between the United States and Europe in how health influences wealth might also have contributed to steeper wealth gradients in health in the former. Major health events lead to wealth depletion among Americans,[45] partly because the uninsured and underinsured use up wealth to cover medical expenses. By contrast, universal healthcare access in Europe may substantially ameliorate this problem.[46] The onset of chronic diseases also reduces work and income,[4,45–47] but further research is needed to examine whether these effects differ between Europe and the United States.

Study Limitations

An important limitation of our study was the reliance on self-reports. Adults in the United States may be diagnosed more often with certain diseases than are Europeans. Thus, we cannot discard the possibility that higher disease prevalence may stem from higher doctor consultation or screening rates in the United States, e.g., for cancer or hypertension.[48,49] However, several lines of evidence indicate that differential reporting may not fully explain the cross-country differences. First, previous studies have indicated that a health disadvantage between England and the United States was also observed for objectively measured biological markers such as plasma fibrinogen, glycosylated hemoglobin A_{1c}, C-reactive protein, and high-density lipoprotein cholesterol.[3] Similarly, when reporting disability, Americans appear to have higher response thresholds than do Europeans.[50] Furthermore, poor Americans are unlikely to receive closer medical surveillance than are European adults, who have access to universal health care.[10,12]

As a secondary validation approach, we compared World Health Organization data on life expectancy and healthy life expectancy between the United States and Europe.[51] Except for women in Denmark, both life expectancy and the number of years a person can expect to live in good health were substantially lower in the United States than in the European countries we studied.[51] Cross-nationally, comparable data on disease prevalence is limited and further confirmatory research is warranted. Yet, these results generally support our findings of a health gap between the United States and many European countries.

We did not explicitly examine the role of race, because data on race were not available for Europe. Because we excluded US minorities, the worse health of Americans compared with Europeans cannot be attributed to racial disparities within the United States. In supplementary analysis, we found that, consistent with a large body of research, US Blacks had generally worse health than did US Whites. For instance, 4% of Whites reported a stroke as opposed to 9% of Blacks, and 14% of Whites reported diabetes as opposed to 26% of Blacks. ORs for a comparison of health across wealth tertiles remained almost unchanged after we incorporated US minorities in the analysis. For instance, ORs for a comparison of the high and low tertiles of wealth were 2.42 (95% CI= 2.12, 2.77) for diabetes and 2.36 (95% CI= 1.88, 2.95) for stroke.

A limitation of our study is that some European countries had relatively low response rates. The lower prevalence of health problems in some countries such as Switzerland may indeed be partly because of selective response. Despite this, a health disadvantage in the United States was also observed compared with countries with relatively high response rates such as France. Furthermore, the fact that our findings are consistent with data on mortality and healthy life expectancy indirectly suggests that response rate differences do not fully account for our main results.

Our purchasing power parity adjustment may not fully capture price differences across countries. Furthermore, we omitted pension

wealth because of the considerable international variation in pension systems. Overall, public pensions are bigger and distributed more equally in Europe than they are in the United States and England.[33] Thus, European households with a certain level of nonpension wealth may actually be wealthier than a household with the same level of nonpension wealth in the United States or England. However, the finding that LOESS curves that used wealth percentile were similar to those that used absolute wealth is reassuring (see Supplementary Figure 1, available at http://www.ajph.org). This suggests that, assuming the ranking of total wealth is preserved, our 2 main findings are robust to price differences and the omission of pension wealth.

Our study focused on middle-aged adults only. Because cross-country health variations might be larger at young ages,[13,37] we may have underestimated the total magnitude of health differences between Europe and the United States.

Conclusions

Americans face a health disadvantage such that no matter what their wealth, their health lags behind that achieved by comparable Europeans. The disadvantage is remarkably pervasive and affects even the wealthy, but is largest for the poor. Tackling risk factors such as obesity and improving the financing and delivery of health services particularly among the poor might partly contribute to eliminating health disparities. Yet, changes in broader social policies and determinants may also be required. Identifying the conditions that result in worse health even among wealthy Americans is an important topic for future research. ■

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Contributors

M. Avendano was responsible for the data analysis and the origination and writing of the article. He was involved in the design and data collection of the Survey of Health, Ageing and Retirement in Europe (SHARE). M.M. Glymour contributed to the data analysis and writing of the article, and commented substantially on all versions of the article. J. Banks commented substantially on all versions of the article and was one of the principal investigators in the English Longitudinal Study of Ageing. J.P. Mackenbach commented substantially on all versions of the article; he was also involved in the design and data collection of the SHARE study.

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Human Participant Protection

The US Health and Retirement Survey was approved by the institutional review board from the University of Michigan Health Services. SHARE in Europe was approved by the institutional review board at University of Mannheim, Germany. Ethical approval for the English Longitudinal Study of Ageing was obtained from the Multi-Centre Research Ethics Committees in England.

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