

Research

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Wealth-Associated Disparities in Death and Disability in the United States and England

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IMPORTANCE Low income has been associated with poor health outcomes. Owing to retirement, wealth may be a better marker of financial resources among older adults.

OBJECTIVE To determine the association of wealth with mortality and disability among older adults in the United States and England.

DESIGN, SETTING, AND PARTICIPANTS The US Health and Retirement Study (HRS) and English Longitudinal Study of Aging (ELSA) are nationally representative cohorts of community-dwelling older adults. We examined 12 173 participants enrolled in HRS and 7599 enrolled in ELSA in 2002. Analyses were stratified by age (54-64 years vs 66-76 years) because many safety-net programs commence around age 65 years. Participants were followed until 2012 for mortality and disability.

EXPOSURES Wealth quintile, based on total net worth in 2002.

MAIN OUTCOMES AND MEASURES Mortality and disability, defined as difficulty performing an activity of daily living.

RESULTS A total of 6233 US respondents and 4325 English respondents aged 54 to 64 years (younger cohort) and 5940 US respondents and 3274 English respondents aged 66 to 76 years (older cohort) were analyzed for the mortality outcome. Slightly over half of respondents were women (HRS: 6570, 54%; ELSA: 3974, 52%). A higher proportion of respondents from HRS were nonwhite compared with ELSA in both the younger (14% vs 3%) and the older (13% vs 3%) age cohorts. We found increased risk of death and disability as wealth decreased. In the United States, participants aged 54 to 64 years in the lowest wealth quintile (Q1) (\leq \$39 000) had a 17% mortality risk and 48% disability risk over 10 years, whereas in the highest wealth quintile (Q5) ($>$ \$560 000) participants had a 5% mortality risk and 15% disability risk (mortality hazard ratio [HR], 3.3; 95% CI, 2.0-5.6; $P < .001$; disability subhazard ratio [sHR], 4.0; 95% CI, 2.9-5.6; $P < .001$). In England, participants aged 54 to 64 years in Q1 (\leq £34,000) had a 16% mortality risk and 42% disability risk over 10 years, whereas Q5 participants ($>$ £310,550) had a 4% mortality risk and 17% disability risk (mortality HR, 4.4; 95% CI, 2.7-7.0; $P < .001$; disability sHR, 3.0; 95% CI, 2.1-4.2; $P < .001$). In 66- to 76-year-old participants, the absolute risks of mortality and disability were higher, but risk gradients across wealth quintiles were similar. When adjusted for sex, age, race, income, and education, HR for mortality and sHR for disability were attenuated but remained statistically significant.

CONCLUSIONS AND RELEVANCE Low wealth was associated with death and disability in both the United States and England. This relationship was apparent from age 54 years and continued into later life. Access to health care may not attenuate wealth-associated disparities in older adults.

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Although the past 50 years have seen significant overall increases in life expectancy worldwide,¹ disparities in mortality along socioeconomic gradients continue to grow, both in the United States^{2,3} and Europe.^{4,5} As the global population ages, there has been a concurrent rise in the rates of disability, raising concerns over whether the gains in longevity are actually contributing to “healthy life expectancy.”⁶ In the United States, the burden of disability is disproportionately borne by those of low socioeconomic status (SES), and this disparity appears to be growing.⁷

Previous studies of the US population have demonstrated a strong association between low SES and both increased risk of mortality⁸⁻¹¹ and increased risk of disability.¹²⁻¹⁸ The seminal Whitehall study in the United Kingdom demonstrated similar findings,^{19,20} as have other studies in Europe.²¹ Most research to date evaluating the effect of SES on health outcomes has used income as the primary marker of financial resources. When studying older adults who may be retired, overall wealth may be a better marker of financial resources.^{22,23} Numerous studies have demonstrated higher correlation of health outcomes with wealth rather than income alone.²⁴⁻²⁶ Overall wealth takes into account measures not traditionally accounted for by income, such as the value of property, savings, assets, and investments. Wealth may provide a cushion during times of income fluctuation, a fund for unpredictable expenses, and most importantly for older adults, a source of purchasing power during retirement.²⁷ Previous studies throughout the past 5 decades have evaluated the relationship between wealth and mortality but with significant limitations including studying preretirement mortality only,²⁷ looking at specialized disease-specific populations,²⁸ and studying men only.^{24,29} Furthermore, although studies dating back to the 1970s have studied the effect of income on disability,³⁰ few have looked at the effect of wealth on disability.

The primary aim of our study was to evaluate the wealth-mortality and wealth-disability relationships in a representative sample of older adults in the United States and England using data from the Health and Retirement Study (HRS) and the English Longitudinal Study on Aging (ELSA). We also sought to determine if the initiation of social safety-net programs in either country affected this relationship. In the United States, for most of the population, reaching age 65 years brings eligibility for health insurance coverage through Medicare. For many, at or close to age 65 years, Social Security payments also start to arrive. In England, health care coverage through the National Health Service (NHS) is provided from birth, but the main retirement benefit, called the State Pension, starts at or close to age 65 years.³¹ Because many safety-net programs become widely available at or close to age 65 years, our secondary aim was to determine whether the wealth-outcomes relationship differed among adults ages 54 to 64 years vs 66 to 76 years.

Methods

Study Population

We examined community-dwelling participants interviewed in the 2002 wave of HRS, a nationally representative sample of US adults older than 50 years,³² and ELSA, a nationally rep-

Key Points

Question Are different levels of wealth associated with death and disability in older adults in the United States and England?

Findings In this cohort study of 12 173 older adults in the United States and 7599 in England, those in the lowest wealth quintile had significantly higher risk of death and disability than their highest wealth counterparts at all ages studied. This relationship was found across the wealth spectrum in both countries, despite differing safety-net health care systems.

Meaning Policies geared toward decreasing wealth-related disparities in death and disability in older adults should target determinants of health outside of access to health care.

resentative sample of English adults older than 50 years that is similar in design to HRS.³³ Baseline response rates were 78.0% for HRS and 70.2% for ELSA.³⁴ In both studies, participants were interviewed biennially on a range of social, health, and economic circumstances. Respondents were followed through 2012 for death and new difficulty in an activity of daily living (ADL).

For the mortality analysis, we created a nationally representative cohort of 19 772 community-dwelling older adults enrolled in HRS (12 173) and ELSA (7599) who were ages 54 to 64 years or 66 to 76 years in the 2002 wave. Respondents who were aged 65 years in 2002 were not included because Medicare enrollment cannot be reliably determined in this age group in HRS. For the disability analysis, those who had ADL difficulty at baseline (HRS, 1568; ELSA, 1374) or missing responses regarding ADL difficulty at baseline (HRS, 4; ELSA, 92) were excluded from the cohort. Respondents without a follow-up ADL assessment were also excluded (HRS, 1710; ELSA, 1421). A total of 13 603 respondents (HRS, 8891; ELSA, 4712) were included in the disability analysis (see eFigure in the Supplement).

Measures

The outcome measures of interest were death and disability (defined as the development of any ADL difficulty). In HRS, the date of death was determined using an algorithm that used the National Death Index, Medicare files, and HRS surviving family member exit interviews. In ELSA, year of death was available, but date of death was estimated using a standard approach developed for HRS. If there was no interview during the death year, the date of death was assigned as July first. If the last live interview occurred in the same year as death, the date of death was assigned as the mean date between the last interview date and the last day of the year.

The HRS and ELSA respondents reported difficulty, not expected to improve within 3 months, with any of 5 ADLs: dressing, bathing, eating, getting in and out of bed, and using the toilet. If the answer to any one of these 5 questions was anything other than fully independent, they were considered as having an ADL difficulty.

Wealth was the primary predictor variable of interest and was determined by participant survey response to a number of financial variables. In HRS, we looked at total wealth, which summed financial assets minus debt. Financial assets included the net

value of real estate, vehicles, businesses, retirement accounts, stocks/mutual funds, bonds, other savings, mortgages, primary residence, and secondary residence. In ELSA, total wealth was measured similarly except without the value of vehicles (see eMethods in the Supplement for additional details). To quantify the level of wealth and income disparity, we calculated the Gini coefficients for these variables in our study sample. The Gini coefficient measures the inequality among values of a frequency distribution, with 0 expressing perfect equality (eg, all persons have same wealth) and 1 expressing maximal inequality (eg, all wealth controlled by 1 person).

Basic demographic information was available for each participant. Respondents reported physician-diagnosed medical problems. We compared the cohorts by the reported presence of 6 major medical comorbidities at baseline: hypertension, diabetes, cancer, chronic lung disease, heart disease, and psychiatric disease. To get a more global sense of functioning, we compared the cohorts by the number of ADL and instrumental activities of daily living (IADL) impairments at baseline.

Statistical Analysis

All analyses incorporated survey weights to account for the complex survey designs of HRS and ELSA. Baseline weighted 20th, 40th, 60th, and 80th wealth quintiles were computed. To study the association of wealth with death, we fit bivariable Cox proportional hazards models of time-to-death on wealth quintile for each group (age 54-64 years vs 66-76 years; HRS vs ELSA). The cumulative incidence of death was computed for each group. In addition to unadjusted models, models adjusted for age as a continuous variable, income quintile, race, sex, and education were run. We fit 5-way interaction models as part of sensitivity analyses to test whether the effect of wealth quintiles on risk of death and ADL difficulty were modified by age, income, race, sex, or education. To test whether the addition of a mobility measure would affect our results, we conducted a sensitivity analysis adding the ability to “walk across the room” as an additional sixth ADL for the disability analysis.

For the disability analyses, we fit bivariable competing risks Cox models with time to any ADL difficulty as the outcome and death as a competing risk.³⁵ For each analytic cohort, we computed the cumulative incidence of ADL difficulty by wealth quintile after fitting the competing risks regression models. We tested the proportional-hazards assumption, overall model fit, model accuracy, outliers, and influential data points using standard metrics.

All analyses were performed using SAS (version 9.4, SAS Inc) and Stata (version 14.1, Stata Corp) statistical packages. Because we relied on deidentified data, the University of California, San Francisco institutional review board determined that this project did not qualify as human research, and written informed consent was waived.

Results

Respondent Characteristics

A total of 6233 US respondents and 4325 English respondents aged 54 to 64 years (younger cohort) and 5940 US

respondents and 3274 English respondents aged 66 to 76 years (older cohort) were analyzed for the mortality outcome (see eFigure in the Supplement). Slightly over half of respondents were women (HRS: 6570, 54%; ELSA: 3974, 52%). A higher proportion of respondents from HRS were non-white compared with ELSA in both the younger (14% vs 3%) and the older (13% vs 3%) age cohorts (Table 1). We found a more than 100-fold difference in wealth across quintiles. For example, for US respondents aged 66 to 76 years, the lowest wealth quintile (Q1) had a mean wealth of \$8366, whereas the highest wealth quintile (Q5) had a mean wealth of \$1363311. Baseline characteristics were similar between cohorts with regard to marital status, comorbid medical conditions, tobacco use, and number of ADL/IADL difficulties.

Inequality in wealth and income based on Gini coefficients was larger in the United States than in England, and larger for wealth than for income in both countries and both age groups (see eTable 1 in the Supplement). For example, for the older age group, the Gini coefficient for wealth in HRS was 0.65 compared with 0.57 in ELSA, and for these 2 groups the respective coefficients for income were 0.49 and 0.35.

Wealth and Mortality, Ages 54 to 64 Years

In the younger cohort, decreasing wealth was associated with increased hazard of death (Figure 1). The HRS respondents in Q1 had a 3.3-fold increased hazard of death compared with their Q5 counterparts (95% CI, 2.0-5.6) (Table 2). The cumulative incidence of death over 10 years for Q1 respondents was 17%, compared with 5% among Q5 respondents. In the ages 54 to 64 years ELSA cohort, Q1 respondents had a 4.3-fold increased hazard of death as their Q5 counterparts (95% CI, 2.7-7.0). The cumulative incidence of death for the lowest wealth quintile was 16%, compared with 4% for the wealthiest. In both countries, the largest difference in mortality was found between Q1 and Q2, with minimal difference between Q4 and Q5. The HRs from the adjusted model were attenuated, but Q1 continued to have a statistically significantly higher hazard of death compared with Q5 (HRS: HR, 2.0; 95% CI, 1.0-4.0; ELSA: HR, 2.6; 95% CI, 1.5-4.5).

Wealth and Disability, Ages 54 to 64 Years

In the younger cohort, the relationship between wealth and disability was similar to the relationship between wealth and mortality (Figure 2). The US respondents in Q1 had a 4-fold increase in the hazard of any ADL difficulty compared with respondents in Q5 (sHR, 4.0; 95% CI, 2.9-5.6) (Table 3). Forty-eight percent of Q1 respondents had disability at 10 years, compared with 15% of Q5 respondents. At 2 years, those in Q1 had similar rates of disability as those in Q5 at 10 years (Figure 2). After 10 years, nearly half of all Q1 respondents had developed an ADL difficulty. Younger English respondents in Q1 had 3-fold increased hazard of any ADL difficulty than their Q5 counterparts (sHR, 3.0; 95% CI, 2.1-4.2). Forty-two percent of Q1 respondents had disability at 10 years, compared with 17% of Q5 respondents. The largest difference in disability in both countries was seen between Q1 and Q2. Sub-HRs from the adjusted model were attenuated, but remained statistically sig-

Table 1. Baseline Characteristics of HRS and ELSA Respondents^a

Variable	HRS Respondents		ELSA Respondents	
	Age 54-64 y (n = 6233)	Age 66-76 y (n = 5940)	Age 54-64 y (n = 4325)	Age 66-76 y (n = 3274)
Age, mean, y	59	71	58	71
Female, no. (%)	3587 (53)	3225 (55)	2306 (51)	1754 (54)
Race/ethnicity, no (%)				
White	4998 (86)	4936 (87)	4191 (97)	3174 (97)
Non-white	1233 (14)	1003 (13)	130 (3)	98 (3)
Marital status, no. (%)				
Partnered	4684 (73)	4037 (66)	3404 (79)	2199 (67)
Not partnered	1541 (27)	1862 (34)	921 (21)	1074 (33)
Average wealth per quintile, \$/£				
Q1	\$6511	\$8366	£3769	£5080
Q2	\$79 312	\$77 626	£71 571	£71 159
Q3	\$184 332	\$183 551	£138 162	£137 203
Q4	\$388 466	\$383 415	£235 366	£233 084
Q5	\$1 503 780	\$1 363 311	£677 604	£583 634
Income, median (IQR), \$/£	\$51 048 (\$25 900-\$90 050)	\$30 252 (\$17 400-\$53 120)	£17 648 (£11 009-£26 256)	£12 313 (£8333-£17 693)
Comorbid medical conditions, no. (%)				
Hypertension	2808 (42)	3215 (53)	1383 (32)	1460 (45)
Cancer	544 (8)	890 (15)	218 (5)	229 (7)
Diabetes	995 (14)	1140 (18)	258 (6)	320 (10)
Chronic lung disease	405 (6)	559 (10)	219 (5)	242 (7)
Heart disease	954 (14)	1508 (25)	523 (12)	724 (22)
Psychiatric disease	860 (14)	637 (11)	384 (9)	151 (5)
Tobacco use, no. (%)				
Ever	3778 (62)	3538 (60)	2781 (65)	2085 (65)
Current	1244 (20)	706 (12)	936 (22)	466 (15)
ADL difficulties, no. (%) ^b				
0	5517 (89)	5084 (86)	3621 (85)	2765 (78)
1	396 (6)	466 (8)	320 (7)	389 (12)
≥2	318 (5)	388 (6)	335 (8)	330 (10)
IADL difficulties, no. (%) ^c				
0	5658 (91)	5242 (89)	3906 (91)	2862 (89)
1	334 (5)	364 (6)	219 (5)	230 (7)
≥2	237 (4)	331 (5)	151 (4)	139 (4)

Abbreviations: ADL, activity of daily living; ELSA, English Longitudinal Study of Aging; IADL, instrumental activities of daily living; IQR, interquartile range; HRS, the US Health and Retirement Study.

^a All the statistics were computed considering HRS and ELSA survey complex design.

^b ADLs assessed: dressing, bathing, eating, getting in and out of bed, and using the toilet.

^c IADLs assessed: using a telephone, taking medication, handling money, shopping, and preparing meals.

nificant in HRS (Q1 vs Q5 sHR, 2.3; 95% CI, 1.5-3.5) and ELSA (Q1 vs Q5 sHR, 2.5; 95% CI, 1.7-3.8).

Similar Results in the Younger (54-64 Years) and Older (66-76 Years) Cohorts

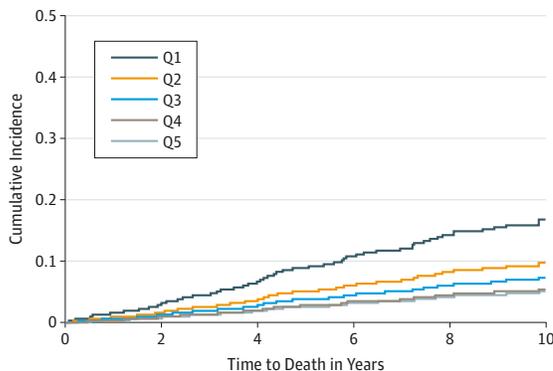
The wealth-outcomes relationship was similar between the younger and older cohorts. After age 65 years, the absolute rate of both death and disability increased in both HRS and ELSA, but no changes were observed in the relationship between wealth and mortality or ADL difficulty (Figure 1). Older US respondents in Q1 had a significantly increased hazard of death compared with those in Q5 (HR, 2.2; 95% CI, 1.8-2.6) (Table 2);

42% of older Q1 US respondents were dead at 10 years. A similar association was present in the older English cohort with a 2-fold increased hazard of death for those in Q1 vs those in Q5 (HR, 2.1; 95% CI, 1.6-2.6); 36% of older Q1 English respondents were dead at 10 years.

The wealth-disability relationship was qualitatively similar to the wealth-mortality relationship and was strong in the older cohort in both the United States and England. Absolute rates of disability at 10 years were high for those with the lowest wealth in both the United States and England, reaching nearly 50% in both countries (Figure 2). In both the United States and England, older respondents in Q1 had a 2-fold in-

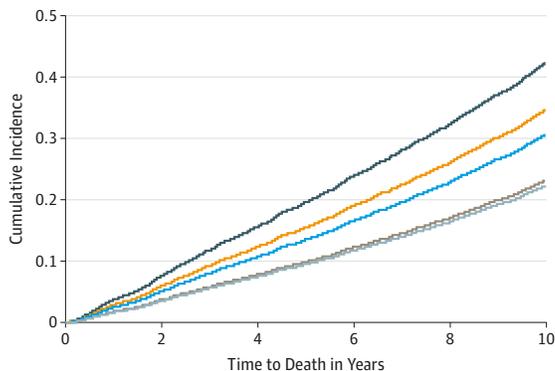
Figure 1. Cumulative Incidence of Death by Wealth Quintile

A Age group 54 to 64 years, HRS



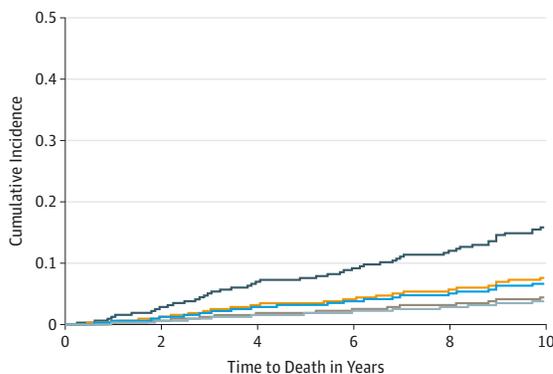
No. at risk	0	2	4	6	8	10
Q1	1356	997	614	384	205	41
Q2	1383	1050	687	433	237	45
Q3	1220	908	612	405	230	46
Q4	1166	926	636	378	221	35
Q5	1107	855	575	345	182	29

B Age group 66 to 76 years, HRS



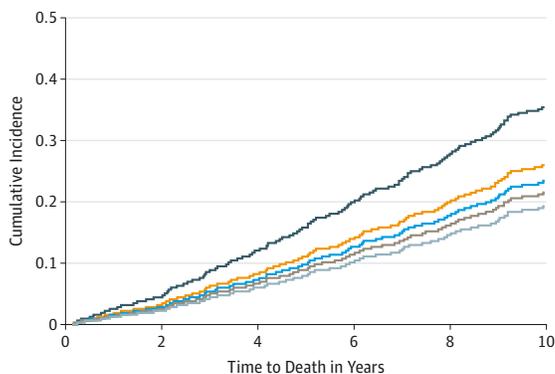
No. at risk	0	2	4	6	8	10
Q1	1128	1131	1022	933	823	719
Q2	1167	1091	1019	945	866	758
Q3	1179	1135	1070	1001	937	840
Q4	1167	1122	1078	1023	962	887
Q5	1199	1160	1120	1067	1010	932

C Age group 54 to 64 years, ELSA



No. at risk	0	2	4	6	8	10
Q1	748	622	483	389	242	35
Q2	807	676	550	386	247	25
Q3	862	735	575	456	290	43
Q4	850	715	586	452	274	31
Q5	967	820	670	502	311	53

D Age group 66 to 76 years, ELSA



No. at risk	0	2	4	6	8	10
Q1	716	622	624	566	513	162
Q2	689	676	628	589	556	200
Q3	620	735	571	543	508	179
Q4	648	715	614	583	551	185
Q5	557	820	526	503	474	149

HRS Indicates the US Health and Retirement Study.

creased hazard of developing an ADL difficulty compared with their Q5 counterparts (HRS: HR; 2.1; 95% CI, 1.8-2.5; ELSA: HR, 2.1; 95% CI, 1.6-2.7). In both countries, the largest gap in death and disability in the older cohort remained between Q1 and Q2, with less difference between Q4 and Q5.

Sensitivity analyses revealed no statistically or clinically significant interactions, nor any change in the wealth-disability relationship with addition of the walking variable (see eTable 2 in the Supplement).

Discussion

We evaluated the relationship between wealth, mortality, and disability among older adults in both the United States and England. We found that for both 54- to 64-year old

adults and 66- to 76-year old adults in both the United States and England, lower wealth was associated with increased hazard of death and disability. Furthermore, the absolute risk of death and disability among those with lowest wealth was high in both countries.

Similar to prior research on more limited cohorts,^{24,27-29} this study found a strong inverse relationship between wealth and mortality. In addition, this study extended prior work by showing the strong inverse relationship between wealth and disability. Disability is a critically important outcome in older adults that is a strong predictor of quality of life,³⁶ hospitalization and nursing home placement.³⁷⁻⁴⁰ We found high rates of disability among the lowest wealth quintile, even in the younger age cohort. The consequences of disability in this group may be disproportionately burdensome. Those with lowest wealth are likely least able to mobilize financial resources

Table 2. Relationship Between Wealth and Mortality in HRS and ELSA

Wealth Quintile	HRS (n = 6232)		ELSA (n = 4234)	
	Unadjusted HR (95% CI) ^a	Adjusted HR (95% CI) ^b	Unadjusted HR (95% CI)	Adjusted HR (95% CI) ^b
Age Group 54-64 Years				
Q1 vs Q5	3.3 (2.0-5.6)	2.0 (1.0-4.0)	4.4 (2.7-7.0)	2.6 (1.5-4.5)
Q2 vs Q5	1.9 (1.1-3.1)	1.4 (0.7-2.6)	2.0 (1.2-3.5)	1.4 (0.7-2.5)
Q3 vs Q5	1.4 (0.8-2.3)	1.1 (0.6-2.1)	1.8 (1.0-3.1)	1.5 (0.8-2.6)
Q4 vs Q5	0.9 (0.5-1.7)	0.8 (0.7-1.3)	1.2 (0.7-2.1)	1.0 (0.6-1.9)
Overall effect of wealth quintile, P value ^c	<.001	<.01	<.001	<.001
Age Group 66-76 Years				
Q1 vs Q5	2.2 (1.8-2.6)	1.7 (1.3-2.0)	2.1 (1.6-2.6)	1.7 (1.3-2.4)
Q2 vs Q5	1.7 (1.4-2.0)	1.3 (1.1-1.6)	1.4 (1.1-1.8)	1.2 (0.9-1.6)
Q3 vs Q5	1.5 (1.2-1.7)	1.2 (1.0-1.5)	1.3 (1.0-1.6)	1.2 (0.8-1.6)
Q4 vs Q5	1.0 (0.9-1.2)	1.0 (0.8-1.1)	1.1 (0.9-1.5)	1.1 (0.8-1.4)
Overall effect of wealth quintile, P value ^c	<.001	<.001	<.001	<.001

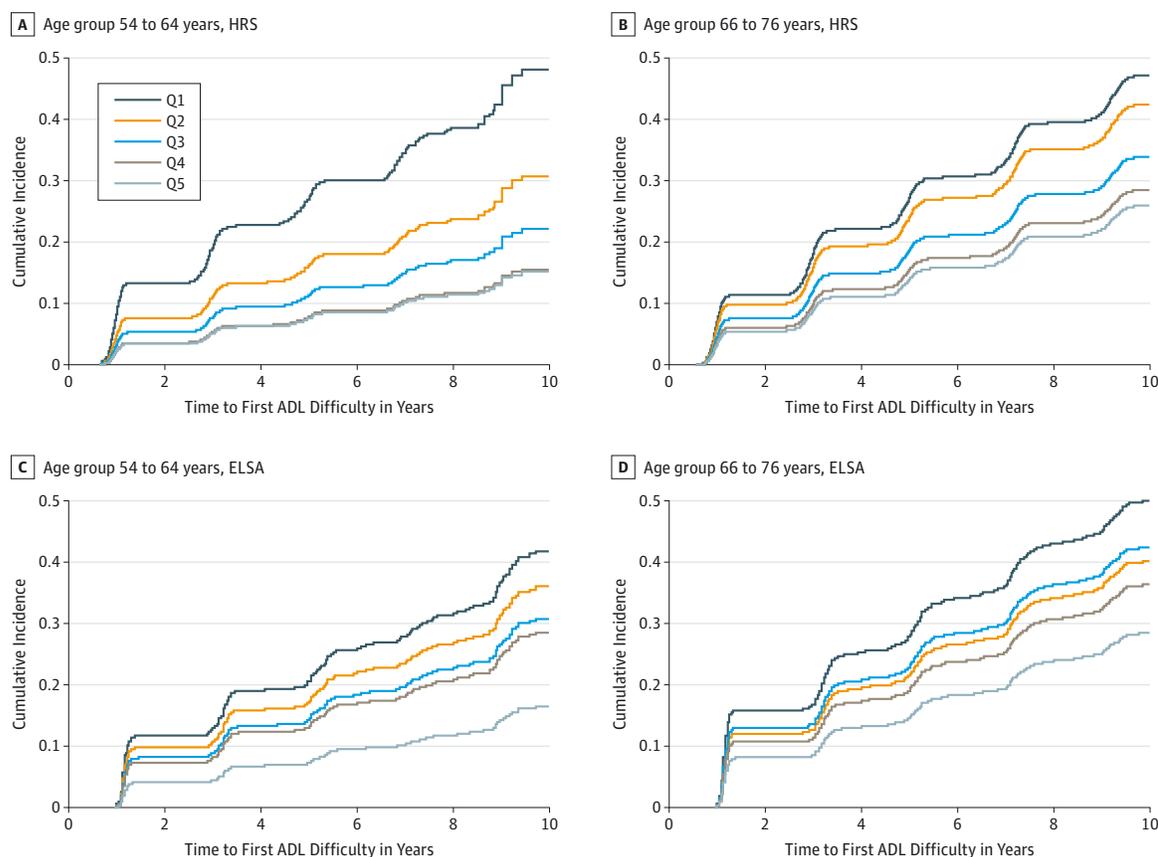
Abbreviations: ELSA, English Longitudinal Study of Aging; HR, hazard ratio; HRS, the US Health and Retirement Study.

^a Hazards of death were obtained from Cox proportional hazards models.

^b Adjusted for race, age, sex, income and education.

^c P value from survey-weighted F-statistic.

Figure 2. Cumulative Incidence of First ADL Difficulty by Wealth Quintile



ADL indicates activity of daily living; ELSA, the English Longitudinal Study of Aging.

to successfully adapt to disabilities through interventions, such as hiring private help, making home modifications, or moving into an assisted living facility.

In our study, the greatest improvements in health outcomes were seen between the lowest wealth quintile (Q1) and the second lowest wealth quintile (Q2). In both countries and

in both age groups, those in Q1 had a much higher hazard of death and disability than those in Q2. Therefore, at the low end of the wealth spectrum, relatively small increases in wealth seem to contribute to substantial gains in life expectancy and function. Our findings extend the results of previous studies of income and mortality, which showed the greatest mortal-

Table 3. Relationship Between Wealth and Disability in HRS and ELSA

Wealth Quintile	HRS (n = 4091)		ELSA (n = 2527)	
	Unadjusted sHR (95% CI) ^a	Adjusted sHR (95% CI) ^b	Unadjusted sHR (95% CI)	Adjusted sHR (95% CI) ^b
Age Group 54-64 Years				
Q1 vs Q5	4.0 (2.9-5.6)	2.3 (1.5-3.5)	3.0 (2.1-4.2)	2.5 (1.7-3.8)
Q2 vs Q5	2.2 (1.6-3.2)	1.6 (1.0-2.5)	2.5 (1.8-3.5)	2.1 (1.5-3.1)
Q3 vs Q5	1.5 (1.1-2.2)	1.3 (0.9-1.9)	2.0 (1.5-2.8)	1.8 (1.2-2.6)
Q4 vs Q5	1.0 (0.7-1.5)	1.0 (0.7-1.4)	1.9 (1.3-2.6)	1.8 (1.2-2.5)
Overall effect of wealth quintile, P value ^c	<.001	<.001	<.001	<.001
Age Group 66-76 Years				
Q1 vs Q5	2.1 (1.8-2.5)	1.7 (1.4-2.2)	2.1 (1.6-2.7)	1.9 (1.4-2.6)
Q2 vs Q5	1.8 (1.6-2.2)	1.6 (1.3-1.9)	1.5 (1.2-2.0)	1.4 (1.0-1.9)
Q3 vs Q5	1.4 (1.2-1.6)	1.3 (1.0-1.5)	1.7 (1.3-2.1)	1.7 (1.2-2.2)
Q4 vs Q5	1.1 (0.9-1.4)	1.1 (0.9-1.4)	1.3 (1.0-1.7)	1.4 (1.1-1.9)
Overall effect of wealth quintile, P value ^c	<.001	<.001	<.001	<.001

Abbreviations: ELSA, English Longitudinal Study of Aging; HRS, the US Health and Retirement Study; sHR, subhazard ratio.

^a Subhazard ratios were obtained by competing risk Cox regression with death as the competing risk and first ADL difficulty as the outcome.

^b Adjusted for race, age, sex, income, and education.

^c P values from survey-weighted Wald χ^2 test.

ity gradient at low income¹⁰ with a continuing but smaller gradient at higher incomes.⁸ These results suggest that health systems should be designed to specifically target the needs of individuals with lowest wealth. Policy interventions to decrease disparities will have the highest impact by focusing on society's poorest members.

Though we did not perform direct statistical comparisons, one of the most surprising findings of our study was the lack of major qualitative differences in the wealth-mortality and wealth-disability relationships in the United States and England despite drastically different health care systems in these countries. Furthermore, although age 65 years heralds the arrival of many social support programs in both the United States and England, we found no evidence of lessened wealth-associated disparities after age 65 years. Although some have hypothesized that the initiation of these safety-net programs may attenuate wealth-associated mortality and functionality disparities,^{23,41} our study suggests otherwise.⁴²⁻⁴⁵ One potential explanation for our findings is that poor health outcomes may stem from cumulative long-term stressors throughout life resulting from low wealth, such as unstable housing, exposure to trauma, and susceptibility to drug and alcohol addiction. Our study suggests that the ability of health care to ameliorate these stressors and improve health later in life is modest. In fact, access to medical care has been estimated to account for only about 10% of avoided preventable mortality in the United States.⁴⁶ Furthermore, with a focus on treatment of disease rather than prevention and health promotion, the point of intervention of the health care system in both the United States and England may be too late to change the health trajectory for low-wealth individuals.⁴⁷ Thus, our results suggest that in planning for population health, countries should focus on fiscal and social policy in addition to health policy, and target interventions earlier in the lifespan.^{48,49} Future studies involving countries participating in the Survey of Health, Aging and Retirement in Europe (SHARE) consortium would be of high value in extending this work to other nations.

Strengths and Limitations

This study has both strengths and limitations. Strengths of this study include: (1) the use of wealth instead of income to better capture financial resources in an older population more likely to be retired; (2) our focus on disability, which has been shown to be critically important to patients³⁶ and predict a wide variety of outcomes³⁷⁻⁴⁰; and (3) our ability to compare between the United States and England. One limitation of the disability analysis was a lack of follow-up data or baseline ADL difficulty data for 3282 HRS participants (27%) and 2887 ELSA participants (38%) included in the mortality analysis (see eFigure in the Supplement). Another limitation was the differences between the US and English comparison groups. While ELSA was patterned after HRS and therefore collected similar data, differences exist between the countries (eg, education) that necessitate different approaches to gathering information on certain variables. Finally, we chose the age of 65 years as a significant age for the initiation of certain safety-net programs in both countries, but in reality certain of these programs come into effect at ages other than 65 years in both the United States and England. For example, social security and Medicaid (United States) and State Pension (England) can be started before or after age 65 years.

Conclusions

We found that lower wealth was associated with higher mortality and disability in older adults in both the United States and England. This relationship was apparent from age 54 years and continued into later life. This study found no evidence that providing state-sponsored health insurance from birth (England), or providing state-sponsored health insurance later in life (United States), eliminated wealth-associated health disparities. Our study suggests that policy makers interested in decreasing mortality and function disparities in older adults should take a broad view and consider interventions beyond providing access to health care.

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