Socioeconomic Position in Childhood and Early Adult Life and Risk of Mortality: A Prospective Study of the Mothers of the 1958 British Birth Cohort

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Objectives. We sought to establish whether women's childhood socioeconomic position influenced their risk of mortality separately from the effects of adult socioeconomic position.

Methods. We examined 11 855 British women aged 14 to 49 years, with mortality follow-up over a 45-year period.

Results. Trends according to childhood social class were observed for all-cause mortality, circulatory disease, coronary heart disease, respiratory disease, chronic obstructive pulmonary disease, stroke, lung cancer, and stomach cancer, with higher death rates among members of unskilled manual groups. Associations attenuated after adjustment for adult social class, smoking, and body mass index. No trend was seen for breast cancer or accidents and violence. Adverse social conditions in both childhood and adulthood were associated with higher death rates from coronary heart disease and respiratory disease. Stomach cancer was influenced primarily by childhood conditions and lung cancer by factors in adult life.

Conclusions. Socioeconomic position in childhood was associated with adult mortality in a large sample of British women. (*Am J Public Health.* 2005;95: 1396–1402. doi:10.2105/AJPH.2004.047340)

In several recent studies, low socioeconomic status or position in childhood has been found to increase the risk of certain causes of mortality, particularly cardiovascular disease.[1] Most studies have been limited to male participants and, often, to a restricted range of causes of death.[1] When women have been included in study populations, these populations have contained insufficient numbers of participants to allow examination of several specific causes of death or have lacked information on important adult risk factors such as body mass index (BMI) and smoking behaviors.[2–8] We therefore know little about how childhood socioeconomic position affects women's risk of mortality and whether adverse conditions increase their risk in the same manner as for men.

Women are generally neglected in studies of major causes of death, such as coronary heart disease,[9] yet there are several reasons why we cannot assume that the risks are the same for men and women and why studies of women are needed. Associations between mortality and adult social position tend to be weaker among women than among men,[10,11] possibly because of gender differences in socioeconomic distributions of exposures, including health-related factors such as tobacco use and obesity.[12] Also, characteristics unique to women that tend to be socially patterned, such as factors related to reproduction, may affect mortality risk.[13] Using data from a large population of British women followed from the beginning of their early adult life, we sought to establish whether childhood socioeconomic position influences risk of mortality separately from the effect of adult socioeconomic position and to determine whether relationships vary according to cause of death.

METHODS

Sample

Participants in this study were the mothers of members of the 1958 British birth cohort. These women were originally enrolled when their offspring were included in the Perinatal Mortality Survey, which included all infants born in England, Scotland, and Wales during a single week in March 1958.[14–16] In 1958, mothers provided information on themselves in response to questionnaires administered by midwives and doctors; information was also obtained from medical records. Further interviews were conducted with the women in 1965, 1969, and 1974. In 1991, their children (the 1958 birth cohort) were asked to provide brief information on their mothers, including whether they were still alive. This information formed the basis of a mortality tracing study that has been described elsewhere.[16]

In brief, mothers of English and Welsh cohort members were identified through the National Health Service Central Register at Southport, England, and mothers of the Scottish residents were identified in the equivalent register in Edinburgh, Scotland. Of 15 888 women, 15 076 were successfully identified. These 15 076 women were "flagged" via a system used to identify and document deaths occurring in the study. Their median age in 1958, at the time of the birth of their infant, was 27 years (range: 14–49 years); 5% were younger than 20 years, 62% were between 20 and 29 years of age, and 33% were 30 years or older.

Measures

Mortality. Data on cause of death were coded according to the *International Statistical Classification of Diseases, 10th Revision* (*ICD-10*).[17] The main endpoints used in this study, recorded as of December 2003, were all-cause mortality (including unknown causes), circulatory disease (*ICD-10* codes I00–I99X, G45, G46), stroke (*ICD-10* codes I61–I69, G45, G46), coronary heart disease (*ICD-10* codes I20–I25), respiratory disease (*ICD-10* codes J00–J998A), chronic obstructive pulmonary disease (*ICD-10* codes J40–J47), stomach

cancer (*ICD-10* code C16), lung cancer (*ICD-10* code C34), breast cancer (*ICD-10* code C50), and accidents and violence (*ICD-10* codes S00–Z999).

Socioeconomic position. Data on mothers' childhood socioeconomic position were obtained from their 1958 interview responses regarding their father's occupation when they left school. Adult socioeconomic position was also based on occupation of the male head of household, that is, husband's occupation as recorded in 1958. Occupations were categorized according to the 1951 Registrar General's Classification, and distinctions were made between nonmanual and manual workers.[15] We combined categories to form 4 social class groups: professional/managerial (classes I and II), unskilled nonmanual (class III nonmanual), skilled manual (class III manual), and unskilled manual (classes IV and V; this category included cases in which there was no male head of household).

Additional indicators of a woman's childhood circumstances included total number of siblings and number of siblings deceased by the time she had left school. Adult risk factors included (1) BMI, derived from measured height (without shoes) and weight before pregnancy (in 1957) and reported in "stone" (1 stone = 6.3 kg [14 lb]), and (2) smoking behavior, derived from women's reports in 1958 of whether they smoked (categories were 0, 1 to 9, and 10 or more cigarettes smoked per day).

Statistical Analysis

We examined the validity of our measure of childhood social class through comparisons with alternative indicators such as number of siblings and number of siblings deceased. Next, we used Cox proportional hazards risk models to estimate relative death rates (and 95% confidence intervals [CIs]) associated with childhood social class (with professional/managerial as the reference category). Analyses were conducted separately for all-cause mortality and specific causes, and adjustment was made for birth year. We conducted trend tests by fitting a linear predictor across childhood social class categories. Adjustments were made initially for adult social class and then for adult social class, BMI, and smoking status. Additional analyses included adjustment for adult height. Death rates, expressed as relative risks, were also estimated for adult social class, and in the case of selected causes they were estimated for a cross classification of childhood and adulthood social class.

Women with missing information on childhood social class (n=2658) were slightly more likely to be members of the manual social class group in adulthood (i.e., 1958) than were women with complete data (77% vs 72%, respectively); they were also more likely to be smokers (23.4% vs 21.4%, respectively), and they exhibited higher all-cause mortality (age-adjusted hazard ratio [HR]=1.13; 95% CI=1.04, 1.22). However, women with and without missing data were similar in terms of age (27.2 vs 27.4 years, respectively) and adult BMI (22.88 vs 22.90 kg/m^2, respectively). Women with missing data on adult social class, prepregnancy BMI, or smoking in 1958 (n=563) were excluded, leaving 11 855 women for the final analyses.

RESULTS

Social class in childhood showed expected trends with selected demographic characteristics. At the birth of their child in 1958, women in social classes I and II (professional/managerial) in childhood were older and taller than women in classes IV and V (unskilled manual) in childhood, and a decreasing trend was observed across the 4 social groups (Table 1). Median number of siblings was lower among women in the professional/managerial group and increasingly higher among women in the other 3 groups, and the percentage of siblings who had died exhibited a similar trend. In addition, there were increases in the percentages of women who were smokers and who were members of the unskilled manual group in adulthood, although there was no trend for BMI from childhood social classes I and II to classes IV and V.

After 45 years of follow-up, 3132 women had died. Age-adjusted analyses of the association between childhood social class and mortality showed a trend in regard to all-cause mortality, with higher risks observed among those in the manual than in the nonmanual classes (Table 2). Similar trends were observed for several specific causes of death, including circulatory disease, coronary heart disease, respiratory disease, chronic obstructive pulmonary disease, lung cancer, stomach cancer, and stroke. Childhood social class was not associated with deaths from breast cancer or from accidents and violence. Adult social class also was associated with mortality from all causes (Table 3) other than breast cancer and accidents and violence.

In general, associations with childhood social class were attenuated after adjustment for adult social class (Table 2). After further adjustment for adult smoking and BMI, a trend with childhood social class persisted for all-cause mortality, circulatory disease,

TABLE 1—Characteristics of Women According to Social Class in Childhood: Mothers of the 1958 British Birth Cohort

		Social Class in Childhood				
	N	I/II (n=2214)	III Nonmanual (n=784)	III Manual (n=5427)	IV/V (n=3430)	*P*
Age in 1958, y	11 855	29.1	28.1	27.6	27.7	<.001
No. of siblings, median[a]	11 795	2	2	3	4	<.001
Sibling(s) deceased, %[a]	11 789	13.5	15.8	19.0	24.4	<.001
Unskilled manual (IV/V) adult social class in 1958, %	11 855	12.2	15.8	20.1	32.5	<.001
Height in 1958, cm	11 855	162.3	161.8	161.2	160.4	<.001
BMI in 1957, kg/m^2	11 855	23.0	22.7	22.8	23.1	.45
Smoker in 1957–1958, %	11 855	32.4	39.5	41.9	43.7	<.001

Note. BMI = body mass index.
[a]By the age at which the women had left school, which was about 15 years among most participants.

TABLE 2—Hazard Ratios (HRs) (With 95% Confidence Interval [CI]) for Association of Mortality With Social Class in Childhood, Adjusted for Age, Social Class in Adulthood, and Adult Smoking and Body Mass Index (BMI) (n = 11 855): Mothers of the 1958 British Birth Cohort

Risk Factor and Adjusted Variables	Social Class in Childhood				*P*
	I/II, HR (95% CI)	III Nonmanual, HR (95% CI)	III Manual, HR (95% CI)	IV/V, HR (95% CI)	
All cause (n = 3132)					
Age	1.00	1.22 (1.04, 1.44)	1.19 (1.08, 1.32)	1.38 (1.24, 1.53)	<.001
Age, adult social class	1.00	1.17 (1.00, 1.38)	1.08 (0.98, 1.20)	1.19 (1.07, 1.33)	.005
Age, adult social class, smoking, BMI	1.00	1.12 (0.95, 1.31)	1.04 (0.94, 1.16)	1.13 (1.01, 1.27)	.05
Circulatory disease (n = 1085)					
Age	1.00	1.40 (1.06, 1.85)	1.43 (1.20, 1.70)	1.66 (1.38, 1.99)	<.001
Age, adult social class	1.00	1.33 (1.01, 1.77)	1.25 (1.04, 1.50)	1.37 (1.13, 1.66)	.003
Age, adult social class, smoking, BMI	1.00	1.28 (0.97, 1.70)	1.20 (1.00, 1.44)	1.29 (1.06, 1.56)	.02
Coronary heart disease (n = 582)					
Age	1.00	1.57 (1.06, 2.30)	1.61 (1.25, 2.07)	1.89 (1.46, 2.07)	<.001
Age, adult social class	1.00	1.46 (0.99, 2.15)	1.35 (1.05, 1.75)	1.47 (1.12, 1.93)	.01
Age, adult social class, smoking, BMI	1.00	1.40 (0.95, 2.07)	1.29 (1.00, 1.68)	1.37 (1.04, 1.79)	.04
Stroke (n = 217)					
Age	1.00	1.49 (0.81, 2.72)	1.40 (0.95, 2.05)	1.51 (1.01, 2.26)	.06
Age, adult social class	1.00	1.47 (0.80, 2.69)	1.30 (0.87, 1.93)	1.33 (0.86, 2.04)	.24
Age, adult social class, smoking, BMI	1.00	1.40 (0.76, 2.56)	1.24 (0.83, 1.86)	1.28 (0.83, 1.97)	.31
Respiratory disease (n = 286)					
Age	1.00	1.33 (0.73, 2.41)	1.60 (1.12, 2.30)	2.19 (1.52, 3.16)	<.001
Age, adult social class	1.00	1.24 (0.68, 2.26)	1.29 (0.89, 1.88)	1.64 (1.12, 2.41)	.01
Age, adult social class, smoking, BMI	1.00	1.09 (0.60, 1.99)	1.19 (0.82, 1.73)	1.51 (1.03, 2.22)	.03
Chronic obstructive pulmonary disease (n = 183)					
Age	1.00	1.21 (0.56, 2.59)	1.55 (0.99, 2.43)	2.19 (1.39, 3.46)	<.001
Age, adult social class	1.00	1.12 (0.52, 2.41)	1.25 (0.78, 1.99)	1.63 (1.01, 2.63)	.04
Age, adult social class, smoking, BMI	1.00	0.96 (0.45, 2.07)	1.13 (0.71, 1.81)	1.48 (0.91, 2.39)	.07
Lung cancer (n = 262)					
Age	1.00	1.09 (0.58, 2.06)	1.41 (0.98, 2.05)	1.92 (1.32, 2.81)	<.001
Age, adult social class	1.00	1.00 (0.53, 1.88)	1.12 (0.77, 1.65)	1.38 (0.93, 2.05)	.08
Age, adult social class, smoking, BMI	1.00	0.83 (0.44, 1.56)	0.98 (0.67, 1.44)	1.21 (0.81, 1.81)	.22
Stomach cancer (n = 42)					
Age	1.00	5.00 (0.83, 29.95)	5.39 (1.27, 22.95)	5.78 (1.32, 25.3)	.02
Age, adult social class	1.00	4.24 (0.70, 25.47)	4.22 (0.98, 18.23)	4.35 (0.97, 19.5)	.07
Age, adult social class, smoking, BMI	1.00	4.46 (0.74, 26.89)	4.16 (0.96, 17.99)	4.15 (0.93, 18.5)	.09
Breast cancer (n = 266)					
Age	1.00	1.01 (0.60, 1.69)	0.86 (0.62, 1.18)	0.95 (0.67, 1.34)	.64
Age, adult social class	1.00	0.99 (0.59, 1.67)	0.84 (0.60, 1.17)	0.93 (0.65, 1.35)	.60
Age, adult social class, smoking, BMI	1.00	0.98 (0.58, 1.65)	0.84 (0.60, 1.18)	0.94 (0.65, 1.35)	.63
Accidents and violence (n = 94)					
Age	1.00	0.94 (0.40, 2.19)	0.82 (0.49, 1.36)	0.64 (0.35, 1.15)	.13
Age, adult social class	1.00	0.95 (0.40, 2.22)	0.83 (0.49, 1.41)	0.64 (0.34, 1.19)	.16
Age, adult social class, smoking, BMI	1.00	0.91 (0.39, 2.13)	0.79 (0.46, 1.35)	0.61 (0.33, 1.15)	.13

coronary heart disease, and respiratory disease (Table 2). In the case of stomach cancer, there was a considerably elevated risk in the other class social groups relative to the professional/managerial group, although, because of the small number of deaths, confidence intervals were wide. Adjustment for adult factors substantially weakened the trend for chronic obstructive pulmonary disease, and the trend for lung cancer was eliminated. In similar analyses of the association between adult social class and mortality, the trends for all causes and specific causes of death, although not eliminated, were less pronounced after adjustment for childhood class, adult BMI, and smoking status (Table 3).

Through a cross-classification of social class during childhood and adulthood, the data presented in Table 4 provide further evidence that influences from both life

TABLE 3—Hazard Ratios (HRs) (With 95% Confidence Interval [CI]) for Association of Mortality With Social Class in Adulthood, Adjusted for Age, Social Class in Childhood, and Adult Smoking and Body Mass Index (BMI) (n = 11 855): Mothers of the 1958 British Birth Cohort

	Adult Social Class (1958)				
Risk Factor and Adjusted Variables	I/II (n = 2158), HR (95% CI)	III Nonmanual (n = 1193), HR (95% CI)	III Manual (n = 5864), HR (95% CI)	IV/V (n = 2640), HR (95% CI)	*P*
All cause (n = 3132)					
Age	1.00	1.16 (1.00, 1.35)	1.36 (1.22, 1.50)	1.75 (1.57, 1.96)	<.001
Age, childhood social class, smoking, BMI	1.00	1.08 (0.93, 1.25)	1.19 (1.07, 1.32)	1.44 (1.28, 1.63)	<.001
Circulatory disease (n = 1085)					
Age	1.00	1.17 (0.90, 1.53)	1.55 (1.30, 1.86)	2.12 (1.75, 2.57)	<.001
Age, childhood social class, smoking, BMI	1.00	1.04 (0.80, 1.36)	1.28 (1.06, 1.54)	1.62 (1.32, 1.99)	<.001
Coronary heart disease (n = 582)					
Age	1.00	1.33 (0.92, 1.94)	1.77 (1.37, 2.30)	2.74 (2.08, 3.60)	<.001
Age, childhood social class, smoking, BMI	1.00	1.16 (0.80, 1.70)	1.40 (1.07, 1.84)	1.99 (1.49, 2.66)	<.001
Stroke (n = 217)					
Age	1.00	0.83 (0.45, 1.50)	1.18 (0.81, 1.71)	1.81 (1.21, 2.71)	.003
Age, childhood social class, smoking, BMI	1.00	0.73 (0.40, 1.33)	1.00 (0.68, 1.49)	1.48 (0.97, 2.27)	.05
Respiratory disease (n = 286)					
Age	1.00	1.01 (0.55, 1.86)	2.24 (1.53, 3.28)	2.82 (1.87, 4.24)	<.001
Age, childhood social class, smoking, BMI	1.00	0.85 (0.46, 1.58)	1.71 (1.15, 2.55)	1.99 (1.29, 3.05)	<.001
Chronic obstructive pulmonary disease (n = 183)					
Age	1.00	1.06 (0.50, 2.27)	2.23 (1.38, 3.60)	2.95 (1.76, 4.92)	<.001
Age, childhood social class, smoking, BMI	1.00	0.88 (0.41, 1.90)	1.62 (0.98, 2.68)	1.94 (1.13, 3.33)	.004
Lung cancer (n = 262)					
Age	1.00	0.98 (0.50, 1.89)	2.12 (1.40, 3.20)	3.39 (2.20, 5.22)	<.001
Age, childhood social class, smoking, BMI	1.00	0.83 (0.43, 1.62)	1.57 (1.02, 2.43)	2.21 (1.40, 3.48)	<.001
Stomach cancer (n = 42)					
Age	1.00	7.47 (1.55, 35.96)	5.55 (1.32, 23.46)	4.21 (0.89, 19.83)	.11
Age, childhood social class, smoking, BMI	1.00	5.47 (1.13, 26.60)	3.54 (0.82, 15.26)	2.45 (0.51, 11.86)	.64
Breast cancer (n = 266)					
Age	1.00	1.20 (0.77, 1.89)	1.07 (0.77, 1.49)	0.97 (0.66, 1.44)	.85
Age, childhood social class, smoking, BMI	1.00	1.23 (0.78, 1.95)	1.10 (0.78, 1.56)	0.99 (0.65, 1.49)	.90
Accidents and violence (n = 94)					
Age	1.00	0.83 (0.38, 1.82)	0.82 (0.48, 1.38)	0.93 (0.50, 1.70)	.72
Age, childhood social class, smoking, BMI	1.00	0.86 (0.39, 1.90)	0.87 (0.50, 1.52)	0.98 (0.51, 1.88)	.91

stages affect risk of death from all causes and from circulatory disease, coronary heart disease, respiratory disease, and stomach cancer. No interaction effects were found between childhood and adulthood social class; rather, the data shown in Table 4 illustrate cumulative effects of social class. Hazard ratios tended to be higher among women in the manual group in both childhood and adulthood than among women in the nonmanual group at both time points.

For example, women's age-adjusted hazard ratios were 1.95 (95% CI=1.58, 2.40) and 2.32 (95% CI=1.72, 3.14) for circulatory disease and coronary heart disease, respectively. In the case of circulatory disease, coronary heart disease, stroke, respiratory disease, and chronic obstructive pulmonary disease, both child and adult social class appeared to contribute to mortality risk. Risks were attenuated slightly after adjustment for adult BMI and smoking, suggesting that social class acts partly through these adult factors. For stomach cancer, the elevated risk associated with childhood social class appeared to carry through to adulthood, irrespective of adult social class, although estimates were imprecise (Table 4).

DISCUSSION

Studies of mortality and socioeconomic position at different life stages can be informative because they provide clues as to when relevant exposures in one's life course might be operating. Socioeconomic position is an important marker of diverse social and physical environmental exposures that might play a role in mortality risk. In this study of women

TABLE 4—Hazard Ratios (HRs) (With 95% Confidence Interval [CI] for Association of Mortality With Social Class in Childhood and Adulthood, Adjusted for Age and Adult Smoking and Body Mass Index (BMI) (n = 11 855): Mothers of the 1958 British Birth Cohort

	Nonmanual Adulthood Social Class		Manual Adulthood Social Class	
Risk Factor and Adjusted Variables	Nonmanual Childhood Social Class (n = 1523), HR (95% CI)	Manual Childhood Social Class (n = 1828), HR (95% CI)	Nonmanual Childhood Social Class (n = 1475), HR (95% CI)	Manual Childhood Social Class (n = 7029), HR (95% CI)
All cause (n = 3132)				
Age	1.00	1.08 (0.93, 1.24)	1.34 (1.16, 1.55)	1.48 (1.32, 1.65)
Age, smoking, BMI	1.00	1.03 (0.89, 1.19)	1.21 (1.05, 1.40)	1.30 (1.16, 1.45)
Circulatory disease (n = 1085)				
Age	1.00	1.33 (1.03, 1.72)	1.69 (1.30, 2.18)	1.95 (1.58, 2.40)
Age, smoking, BMI	1.00	1.25 (0.97, 1.62)	1.49 (1.15, 1.92)	1.66 (1.34, 2.05)
Coronary heart disease (n = 582)				
Age	1.00	1.41 (0.97, 2.04)	1.89 (1.31, 2.73)	2.32 (1.72, 3.14)
Age, smoking, BMI	1.00	1.30 (0.90, 1.89)	1.61 (1.11, 2.33)	1.90 (1.40, 2.58)
Stroke (n = 217)				
Age	1.00	1.31 (0.76, 2.26)	1.54 (0.89, 2.67)	1.70 (1.09, 2.64)
Age, smoking, BMI	1.00	1.27 (0.74, 2.18)	1.43 (0.82, 2.49)	1.53 (0.98, 2.39)
Respiratory disease (n = 286)				
Age	1.00	1.12 (0.63, 1.99)	1.86 (1.08, 3.21)	2.71 (1.74, 4.20)
Age, smoking, BMI	1.00	1.07 (0.60, 1.90)	1.65 (0.96, 2.85)	2.27 (1.46, 3.53)
Chronic obstructive pulmonary disease (n = 183)				
Age	1.00	1.46 (0.70, 3.03)	2.33 (1.15, 4.71)	3.08 (1.71, 5.58)
Age, smoking, BMI	1.00	1.35 (0.65, 2.80)	1.92 (0.95, 3.89)	2.41 (1.33, 4.37)
Stomach cancer (n = 42)				
Age	1.00	3.42 (0.71, 16.48)	1.87 (0.31, 11.20)	4.16 (0.99, 17.42)
Age, smoking, BMI	1.00	3.17 (0.66, 15.34)	1.60 (0.27, 9.65)	3.48 (0.83, 14.65)

we found that, for certain specific causes of death such as lung cancer, mortality risk was influenced primarily by adult factors. However, in the case of circulatory disease, coronary heart disease, respiratory disease, and stomach cancer, there appeared to be an additional contribution of socioeconomic adversity in early life.

To illustrate, we point out that both child and adult circumstances were related to risk of death from coronary heart disease; women in a manual social class group on both occasions had a risk of death that was more than double that for women in a nonmanual social class group at both time points. Hence, women in our study showed patterns of mortality risk associated with childhood social class that tended to mirror those observed for men.[1] Our results for coronary heart disease add to previous work by suggesting that early life socioeconomic circumstances act partly through their influence on adult risk factors such as BMI.[18] Only a few previous studies have examined the association of childhood conditions with stomach cancer among either men or women, and some,[18] but not all,[19] of these investigations have shown an increased risk of death related to adverse childhood conditions. Our results are consistent with such an effect. However, the previously reported finding for men of an influence of childhood social class on stroke mortality[20] was equivocal among the women in our study.

Methodological Considerations

All of the women were parents of a child born in 1958. By definition, the women were all healthy enough to reproduce, and a favorable health profile is suggested by their lower overall mortality rate than the general population.[16] The strengths of our study include the large sample, nationwide coverage, the long period (45 years) of mortality follow-up, and the availability of data on relevant adult risk factors. Women with no information on childhood social class had a higher all-cause risk of mortality (age-adjusted hazard ratio = 1.13), but differences in adult social class, smoking status, BMI, and age were small. Omission of these women from our analyses would have biased our results if the pattern of association between mortality and social position observed in this group differed from the pattern observed among women with complete data, an unlikely possibility. However, childhood social class was recalled after several years (some women reported this information at the time they left school, about age 15–16 years for most of the participants; the overall mean age at which these data were reported was 27 years), and thus some misclassification may have occurred.

We found that trends were as expected in terms of family size, adult social position, sibling mortality, and adult smoking status and height, supporting the validity of our childhood social class measure. Biases in regard to recalled childhood social class and to the sample of women traced would have tended to lead to underestimates of the association between childhood social class and mortality. Information on adult social class was collected contemporaneously in 1958 rather than recalled, and the timing of the measure corresponded to an early to middle stage of their husbands' occupational careers. Hence, women's adult social class would have been largely unaffected by downward social mobility owing to ill health, which would have been more common at later stages of the husbands' working lives.

Alternative measures of adult social position were lacking from data recorded in 1958 (income), missing for a substantial group of women (maternal occupation), or limited in their capacity to differentiate between groups in this population (education). Adult socioeconomic position based on husband's occupation was associated with maternal height, and, among offspring, it predicted perinatal

mortality and low birthweight.[15] This suggests that our measure of adult socioeconomic position is valid. We recognize, however, that in the case of adult smoking status and BMI, there may have been changes subsequent to the baseline data collection in 1958 and over the 45-year follow-up period.

Comparisons With Other Studies

Most of the women (62%) in our study were born between 1929 and 1938, and thus our findings relate to effects of childhood socioeconomic position around this time. Other studies have tended to focus on associations with childhood social position among younger-born generations of women, and mortality follow-ups have correspondingly involved earlier stages of adult life.[5–7] One might expect the magnitudes of childhood social class effects to vary over time, given that postwar generations in many countries have seen improving socioeconomic conditions. However, associations between all-cause mortality and childhood manual class do not appear to have diminished: the results of one study showed that women born in 1946 had a hazard ratio of 2.5 (95% CI=1.4, 4.5),[5] as compared with age-adjusted hazard ratios among women in our study of 1.19 (95% CI=1.08, 1.32) for those in the skilled manual group and 1.38 (95% CI=1.24, 1.53) for those in the unskilled manual group.

We found that women from social classes IV and V in childhood had a 37% excess risk of coronary heart disease mortality after allowance for adult factors. Thus, our findings are consistent with previous studies suggesting a role of early life conditions in the development of coronary heart disease. Women enrolled in the Alameda County Health Study who were of lower socioeconomic position in childhood had an excess cardiovascular disease mortality risk of about 30%.[8] Similarly, in the US Nurses' Health Study, participants whose fathers had been manual laborers had excess risks of coronary heart disease and nonfatal myocardial infarctions of 50% to 70% relative to participants from professional social class backgrounds.[2] Our study demonstrates the better known association—at least among men—between adult social class and coronary heart disease. Furthermore, when we considered child and adult social position together, we found that the risk of death from coronary heart disease among women who were in manual social class groups at both time points was about double that among women who were in the nonmanual groups on both occasions.

Results of previous studies focusing on child and adult socioeconomic circumstances and death from stroke have been inconsistent, with one study of men[18] and one study of women[8] revealing an increased risk of death related to adverse conditions in early life and another study of women showing no relationship.[2] The inconsistencies in the literature are not resolved by our borderline association between childhood social class and death from stroke, which weakened after adjustment for other factors. Inconsistencies across studies might be expected given changing trends in stroke mortality and changes in definitions of subcategories and associated underlying causes.[21]

In regard to other causes of death, including respiratory disease, it is unfortunate that there are few studies with which to compare our results.[1] One study of poor housing conditions revealed no excess risk of death from chronic obstructive pulmonary disease.[19] However, the British Women's Heart and Health Study showed that childhood poverty was associated with reduced lung volume and peripheral airway obstruction in later life.[22] In turn, impaired lung function has been shown to increase risk of death from respiratory disease.[23] Among the women in our study, the trend in respiratory disease mortality seen for childhood social class weakened after allowance for adult factors, suggesting that social conditions in childhood operate partly through their link with adult influences such as tobacco use. However, an effect of childhood class remained. As an illustration, the hazard ratio for women in the unskilled manual group decreased from 2.19 (95% CI=1.51, 3.16) to 1.51 (95% CI=1.03, 2.23) after adjustment for adult factors, indicating possible long-term effects of childhood adversity, as shown elsewhere for lung function.[22]

Similarly, our study contributes to the literature on stomach cancer, which only rarely has considered the role of childhood conditions. One study of men showed an adverse effect on mortality of poorer social conditions in childhood,[18] but such an effect was not seen in another study.[19] Our results tend to support an adverse effect of poor childhood conditions on risk of death from stomach cancer. The cross-classification of child and adult social positions suggested that the risk associated with adversity in childhood is not overcome by more favorable conditions in adulthood. However, we acknowledge that our study lacks statistical power because of the small number of deaths, and therefore that our conclusions should be treated with caution.

How Do Conditions in Early Life Influence Adult Outcomes?

Our results regarding childhood social class and mortality from coronary heart disease and respiratory disease remain to be explained. One explanation, supported by this study, is that childhood social position affects smoking behavior and BMI subsequently in adulthood. Other adult behaviors affecting mortality risk could also be associated with childhood social class.

A second explanation is that an adverse early environment could influence nutrition around the time of birth or during early childhood. Adversity in early life can stunt growth, and shorter stature is associated with risk of mortality from coronary heart disease.[24] We found no diminution in the effect of childhood social class when allowance was made for adult height (data not presented); however, adult height does not adequately capture effects of early adversity on growth in utero or on childhood height,[25] and it therefore remains possible that poor growth in early life is involved.

Third, it has been argued that childhood social conditions could be related to exposure to infections that subsequently influence risk of stomach cancer.[18,19] In the case of this disease, the probable explanation of the childhood social class effect is that *Helicobacter pylori* infection, which generally occurs in infancy and childhood and is related to poor social circumstances, increases the risk of stomach cancer in late adulthood.

Inequalities in Mortality and Adult Social Position

Our study provides evidence that adult socioeconomic position influences overall

mortality and mortality from certain specific causes among women. We observed some trends that would be expected. For example, overall death rates tend to increase from nonmanual to manual social classes, as well as death rates from circulatory and respiratory diseases,[26,27] lung cancer, and stomach cancer.[28,29] In addition, trends are weak or absent for deaths from breast cancer and accidents and violence.[26,27] Also, studies elsewhere have suggested that socioeconomic differences in mortality from external causes among women are not as pronounced as they are among men.[11]

Women have been neglected in follow-up mortality studies. Our study of British women followed over a 45-year period in their adult lives shows socioeconomic inequalities in mortality, with adult social position having a strong influence on several causes of death. Socioeconomic adversity in childhood is one factor that appears to underlie the development of adult inequalities in overall mortality along with mortality resulting from circulatory disease, coronary heart disease, respiratory disease, and, possibly, stroke. For these causes of death and for stomach cancer as well, our study suggests that elevated death rates associated with adverse childhood conditions reflect not merely continuities in socioeconomic position but long-lasting effects of childhood exposures.

Thus, our study highlights the need to address socioeconomic inequalities in childhood, as well as those in adult life. Future research should be directed at identifying the extent to which other health outcomes are influenced by childhood socioeconomic position. In addition, a better understanding is needed of the primary processes linking childhood and adult outcomes and of the ways in which early life adversity can be overcome. ■

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Contributors

C. Power drafted the article, and E. Hyppönen carried out the statistical analyses. All of the authors contributed to the study design and the final version of the article.

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Approval for this study was granted by the Medical Research Services section of the Office for National Statistics, and ethical approval for the record linkage was obtained from the Local Research Ethics Committee of Great Ormond Street Hospital/Institute of Child Health, London, England.

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