

Accumulated labour market disadvantage and limiting long-term illness: data from the 1971–1991 Office for National Statistics' Longitudinal Study

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Background	Both social class and unemployment have been shown in many studies to be related to ill health. Recent work in social epidemiology has demonstrated the importance of examining the accumulation of disadvantage over the life course. This paper therefore uses a large longitudinal data set to examine the accumulation of both disadvantaged class and unemployment over a 20-year period in a representative sample of the male working population of England and Wales.
Methods	Logistic regression.
Results	Both membership of semi- or unskilled social class and unemployment in 1971 were related to limiting long-term illness (LLTI) in 1991 independently of each other, and of subsequent social class and unemployment. Any occurrence of disadvantaged social class or of unemployment added significantly to the risk of LLTI. A labour market disadvantage score comprising the number of occasions on which a study member had been either in a disadvantaged social class or unemployed showed a clear and graded relationship to illness, with odds of 4 to 1 in the worst-scoring group.
Conclusion	The experiences of disadvantaged social class or unemployment at any time during this period contributed independently to an increased risk of chronic limiting illness up to 20 years later in the life course. Whereas improvements in social conditions at any one time will lessen the long-term combined impact of accumulated labour market disadvantage on health, it may not prove easy to obtain short term improvements in health inequality.
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Relationships have frequently been demonstrated between health and both social class and unemployment in cross-sectional studies.^{1–5} However, doubts have always remained as to the value of such cross-sectional data. Because individuals may be more likely to be found in a disadvantaged social position because of their health difficulties,^{6–8} a longitudinal design is preferred when investigating relationships of social class or unemployment to health.

It is now becoming increasingly accepted that a fruitful approach to understanding the social and economic precursors

of ill-health in adult life is to look for a tendency for advantages and disadvantages to accumulate over the life course of individuals. Longitudinal research has found health in mid and later adult life to be related to an accumulation of social risks, including socioeconomic disadvantage in childhood, adult social class, working conditions and unemployment.^{9–13}

Longitudinal data from the Office for National Statistics' Longitudinal Study (ONS LS) make it possible to extend this work to a representative data set covering the working age male population of England and Wales. We do this by examining the relationship of limiting long-term illness (LLTI) at the time of the 1991 census of England and Wales to labour market experience, that is, occupational social class and economic position, of some 60 000 working age men over a period of 20 years, from

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1971 to 1991. The accumulation of advantage and disadvantage in women needs to be addressed by a more complex analysis due to discrimination in the labour market and to women's responsibilities for unpaid domestic labour.¹⁴

Data and Methods

Data used in this paper are taken from the ONS LS. This data set links mortality and morbidity to information on social and demographic circumstances over the period 1971–1991 for an approximate one per cent of the population of England and Wales, some 500 000 individuals. Sampling was started at the time of the 1971 census and includes everyone born on any one of four dates of any year. It is regularly updated to include new members who are born on any of the four relevant days in each year, and events such as deaths and cancer registrations. Data are linked across decennial censuses for sample members, so that it is possible to examine changes in occupation and employment status in the periods 1971–1981 and 1981–1991. In general, information on census characteristics such as occupation is only available at the time of each census and not in between.^{15–17} Aggregated data from the study are available to academic researchers subject to strict controls to preserve confidentiality. Included in this analysis are data for approximately 60 000 men. Numbers vary slightly between the Tables due to missing values on different variables.

Limiting long-term illness

In 1991 the census of England and Wales included, for the first time since 1911, a question on health status. The household member who fills out the census form (the 'household reference person') is asked, for themselves and each other household member: *'Does the person have any long-term illness, health problem or handicap, which limits his/her daily activities or the work, he/she can do? Include problems which are due to old age.'*

Social class

The measure of social position used is social class as defined by the Registrar General. This classification is described as a measure of general standing in the community based on occupational skill.^{18,19} Class I, professionals and owners or managers of large businesses, is regarded as the 'highest' level, and class V, unskilled manual workers, as the 'lowest'. Class III is divided into two subgroups: IIIN non-manual, the more routine non-manual jobs and IIIM manual, the most skilled manual jobs. Around 15% of men (10 224) in this age cohort were not able to be allocated to a social class at one or more Census points (6745 or 10.5% in 1971, 1846 or 2.9% in 1981, and 3155 or 4.9% in 1991, with some degree of overlap). The main reason for this is that the individual respondent is classified as a student, a member of the armed forces, or gives no classifiable occupation at the census. These respondents are described as having 'no valid social class', and are omitted from some Tables. Non-manual classes I, II and IIIN have been combined, as have the semiskilled and unskilled manual classes IV and V. This is a widely used three-way grouping of the social classes, which avoids small groups at the extremes of the distribution. At each census, social class is allocated according to the present or most recent job. Because there are 10 years between censuses, 'most recent' may refer to a job held some time in the past.

Economic position

The term 'economic position' is used to refer to the relationship of the individual to the labour market. The 'economically active' are divided into those with paid employment and those who are unemployed but seeking work. The 'economically inactive' group includes those who are permanently or temporarily sick and those who neither have, nor are seeking, paid employment for reasons other than health, for example retirement (at any age) or because of family responsibilities. In order to minimize the effect of very long term ill health causing both a history of unemployment and the report of chronic illness in 1991, all men who said they were either permanently or temporarily sick or otherwise economically inactive in 1971 or 1981 have been excluded. Economic position at the 1991 census has also been excluded from the statistical models. This is because it is possible that an illness that has occurred for the first time between 1981 and 1991 may itself have been a cause of unemployment in 1991.

Age

One problem concerning the analysis of life course data is whether the 'same' event may have different effects according to the time in the life course at which it takes place. Power *et al.*¹¹ have reported that the timing of events made no difference to their contribution to health inequality at age 33 in a representative British cohort born in 1958. In this paper, which covers a wide age group, we address this problem by testing for any interaction of measures of labour market disadvantage with age. This will indicate whether having been unemployed or in a disadvantaged social class a certain number of times has a different effect on the risk of long-term illness in men of different ages at the beginning of the period of observation.

Results

Table 1 shows patterns of employment and non-employment over the period 1971 to 1991 in men aged 15–40 at the beginning of this period and therefore 35–60 at the end, and who were not unable to work due to ill health in 1971 or 1981. In this Table, men who, in 1991, were out of employment for any reason (unemployment, ill health or early retirement) are included and classified as 'not employed'. There is a great deal of movement into and out of employment: almost 75% of those unemployed in 1971 and 70% of those unemployed in 1981 were employed in 1991. However, the risk of not being in employment in 1991 is also greatly increased by prior unemployment. Over 25% of those unemployed in 1971, 30% of those unemployed in 1981, and almost 46% of those unemployed at both of these census points were also unemployed in 1991, compared to under 12% of those employed in 1971 and 1981.

Table 2 shows the relationship of social class according to present or most recent occupation in 1991 to labour market history over the previous 20 years. Men in the non-manual classes are far less likely to have experienced unemployment at the time of any previous census. For example, only 6.3% of men who had been unemployed at all three censuses were classified as being in social classes I to IIIN at the 1991 census, compared to 45% of all men. By contrast, almost 46% of men who had been unemployed at all three censuses were in classes IV or V compared to only 19.1% of all men.

Table 1 Economic position in 1991 by economic position in 1971 and 1981. Men aged 15–40 in 1971, not permanently sick or inactive in 1971 or 1981

Economic position in 1971	Economic position in 1981	Economic position in 1991		N
		Employed	Not employed	
Employed	Employed	88.1	11.9	51 437
	Unemployed	71.9	28.1	2730
	All employed in 1971	87.3	12.7	54 167
Unemployed	Employed	80.5	19.5	1352
	Unemployed	54.3	45.7	383
	All unemployed in 1971	74.7	25.3	1735
All employment statuses in 1971	Employed	87.9	12.1	52 789
	Unemployed	69.7	30.3	3113
All in 1991		86.9	13.1	55 902

Table 2 Social class in 1991 by economic position in 1971 and 1981. Men aged 15–40 in 1971, with a valid social class in 1991 and not permanently sick or inactive in 1971 or 1981

Economic position in 1971 (ages 15–40)	Economic position in 1981 (ages 25–50)	Economic position in 1991 (ages 35–60)	I, II or IIIN	IIIM	IV or V	N = 100%
Employed	Employed	Employed	47.6	34.9	17.6	45 317
		Unemployed	34.5	39.1	26.5	2660
		Sick/inactive	38.4	37.0	24.6	3460
	Unemployed	Employed	23.6	47.1	29.2	1963
		Unemployed	13.6	47.0	39.4	536
		Sick/inactive	12.1	47.6	40.3	231
Unemployed	Employed	Employed	33.4	38.1	28.6	1088
		Unemployed	22.7	42.0	35.3	150
		Sick/inactive	17.5	42.1	40.4	114
	Unemployed	Employed	13.0	45.7	41.3	208
		Unemployed	6.3	48.0	45.7	127
		Sick/inactive	14.6	35.4	50.0	48
	All men		45.0	35.8	19.1	55 902

Logistic regression models were used to explore the relationships between social class and employment status and LLTI, and the extent to which these relationships were due to the ages of different social class and employment groups. Table 3 shows univariate odds of LLTI associated with each of the labour market variables, and the effect on each of these of adjustment for those in the preceding census. Class and economic position are treated as categorical, age is treated as continuous and entered as a linear term. The first column gives the univariate odds for each variable, adjusted for age only. Each subsequent model gives the effect on the class difference in LLTI in 1991 of labour market position and social class in each of the earlier censuses. The reduction in the odds ratios (OR) show how far the effect of 1991 class might be the outcome of earlier labour market disadvantage. The reduction in deviance shows the way in which each variable adds to the power of the model in explaining LLTI in 1991. All the indicators of labour market position remain significantly related to LLTI with the exception of being in social class IIIM in 1981. Unemployment at the 1981 census was strongly related to LLTI 10 years later in 1991 with an OR of 1.94; unemployment in 1971 showed a similarly strong relationship to illness 20 years later, with an odds ratio of 2.03. However, social class in 1991 remained independently related to LLTI even after taking account of unemployment

at previous censuses and previous social class. Perhaps most surprising is the finding that class 20 years previously remains significantly associated with LLTI in 1991, even after adjustment for class in 1981 and 1991 and for unemployment at the 1981 census. In the fully adjusted model, unemployment at both time points, and membership of the most disadvantaged social classes at all three times, each retain the ability to predict ill-health 10 to 20 years after they have occurred. Each variable adds significantly to the model, as can be seen by the reduction in deviance at each step.

Table 4 shows the relationships of LLTI to the number of times a man had been in social classes IV or V over the whole of the period 1971–1991, and the number of times unemployed in 1971 and 1981 (to avoid selection bias, unemployment in 1991 is not analysed). Adjusted for age only, there is a clear and graded relationship between each variable and LLTI. Men who had been in social classes IV or V on all three occasions were over twice as likely to have LLTI in 1991 than those who had never been in these classes, and men who had been unemployed in both 1971 and 1981 were over three times as likely to have LLTI. Adjustment for unemployment experience only reduced the odds associated with continuously low social class from 2.00 to 1.93. Adjustment for continuously disadvantaged social class reduced the odds associated with unemployment from 3 to 2.5.

Table 3 Men aged 15–40 in 1971, with valid social class and not 'permanently sick or inactive' at 1971 and 1981 Census. Estimated odds (95% CI) of limiting long-term illness in 1991

Adjusted for:	Age only	+ econ. stat. in 1981	+ class in 1981	+ econ. stat. in 1971	+ class in 1971
Class 1991					
I to IIIN	1	1	1	1	1
IIIM	1.57 (1.46–1.68)	1.53 (1.43–1.64)	1.37 (1.25–1.51)	1.37 (1.24–1.50)	1.28 (1.16–1.41)
IV–V	2.10 (1.95–2.27)	2.04 (1.89–2.20)	1.66 (1.50–1.84)	1.65 (1.49–1.83)	1.51 (1.36–1.68)
Economic status 1981					
Employed	1	1	1	1	1
Unemployed	1.94 (1.73–2.19)	1.70 (1.50–1.91)	1.67 (1.48–1.88)	1.60 (1.42–1.80)	1.59 (1.41–1.80)
Class in 1981					
I–IIIN	1		1	1	1
IIIM	1.50 (1.40–1.60)		1.14 (1.04–1.26)	1.14 (1.04–1.25)	1.02 (0.92–1.13)
IV–V	2.04 (1.89–2.21)		1.39 (1.25–1.55)	1.38 (1.24–1.53)	1.18 (1.05–1.32)
Economic status 1971					
Employed	1			1	1
Unemployed	2.03 (1.73–2.39)			1.64 (1.39–1.93)	1.62 (1.37–1.91)
Class 1971					
I–IIIN	1				1
IIIM	1.57 (1.47–1.69)				1.25 (1.14–1.38)
IV–V	2.09 (1.93–2.26)				1.45 (1.30–1.61)
–2 log LR		32 077.1	32 038.0	32 006.8	31 959.3
Reduction in deviance		68.0	39.1	31.2	47.5
d.f.		+1	+2	+1	+2

N = 53 961.

The variables representing both of these accumulations of labour market disadvantage retained their ordered gradient and remained highly significant independently of each other.

However, each of these variables did show a significant interaction with age. The effects of experiencing more occasions of unemployment and disadvantaged social class were not the same in all age groups. In particular, the effect of unemployment was greater in older men.

Because the measures of unemployment and disadvantaged social class were correlated ($P < 0.01$) but did not interact and had independent effects, they were combined into a labour market disadvantage score. Men who were off-work sick in 1991 were included in this analysis because although ill health in 1991 might cause unemployment or lower class in 1991, it could hardly have caused either unemployment or low class

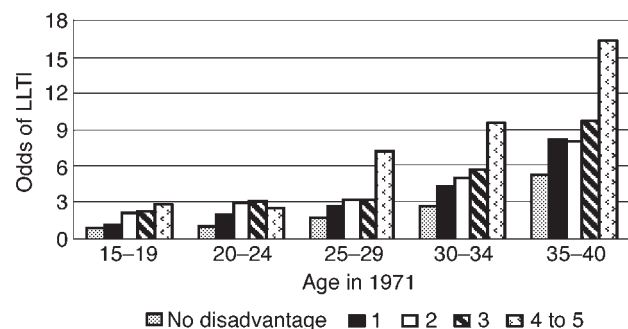
Table 4 Odds of limiting long-standing illness in 1991. Men aged 15–40 in 1971, with a valid social class at all three Censuses and not permanently sick or inactive in 1971 or 1981. Estimated odds (95% CI) of limiting long-term illness in 1991

	Adjusted for age	Mutually adjusted
No. of times in low class		
0	1	1
1	1.56 (1.45–1.69)	1.51 (1.40–1.63)
2	1.86 (1.70–2.03)	1.78 (1.62–1.94)
3	2.00 (1.81–2.21)	1.93 (1.74–2.13)
No. of times unemployed		
0	1	1
1	1.88 (1.70–2.10)	1.68 (1.51–1.87)
2	3.04 (2.18–4.24)	2.50 (1.79–3.50)

N = 53 961.

20 years previously in 1971 and would be unlikely to have done so in 1981. The score has a range of 0–5 (0 to 2 times unemployed plus 0–3 times in a disadvantaged social class) and is treated as a linear term: the use of dummy variables did not appreciably improve the fit of the model. For each increase in the labour market disadvantage score, the estimated risk of LLTI was increased by 30% (OR = 1.3). Compared to those who reported neither disadvantaged class nor unemployment at any census, those who reported these at all three census points were almost four times as likely to have LLTI (OR = 3.92, 95% CI: 3.46–4.48).

A test for interaction between accumulated labour market disadvantage and age was significant, indicating that the relationship of labour market disadvantage to LLTI was not the same in all age groups, although this was a small effect. Figure 1 shows that accumulated labour market disadvantage tended to have a stronger effect in older men.

**Figure 1** Labour market disadvantage by limiting long-term illness (LLTI): interaction with age

Discussion

This analysis adds to the existing evidence on the origins of social inequality in health over the life course.^{10,12,13,20,21} It differs from other studies in that it examines the full span of working age in a large representative sample of men in England and Wales. Unemployment and relatively disadvantaged social class position were seen to be related to the risk of limiting illness 20 years further on in the life course. A summary measure of labour market disadvantage was built up for individuals in an analogous way to the 'deprivation scores'^{22,23} now commonly used in studies of area variations in health and need for health services.

The cohort of men observed in this study was aged 15–40 in 1971, and therefore could have remained economically active during the whole period 1971–1991. Those included in the statistical models were not temporarily or permanently too ill to work in 1971 or 1981 and had a valid social class measurement, which means that they will be somewhat selected for good health.²⁴ The unemployed population has been shown to be selected for good rather than poor health.^{25,26} This is so even when unemployment rates are high, as at these times the size of the active labour force shrinks and the proportions of men leaving economic activity altogether for early retirement or permanent sickness increase.^{26,27} The inclusion of those men who were unemployed and actively seeking work in 1971 and 1981 would, if anything, act on top of the exclusion of the permanently and temporarily sick in 1971 and 1981 to ensure that 'selection for poor health' did not play a major role in producing these results. Economic position (employed, unemployed, inactive) was observed only at the time of each of the censuses, with nothing known about this for the years in between. However, those who experience one spell of unemployment are known to be at higher risk of further spells.^{28,29} The tendency for the effect of unemployment to be stronger in older men is likely to be due to the fact that these intermittent indicators represent a much greater total exposure to unemployment in these men.

Adjustment for unemployment history did not greatly change the degree to which social class trajectories increased the risk of illness, while adjustment for social class trajectory had a greater effect on the relationship of unemployment to health. This confirms that unemployment acts as both a cause of increased

health risk in itself, and as an indicator of an individual's position in the structure of socioeconomic advantage. That is, one reason why unemployment is associated with poor health is because of the experience of employment relations and conditions which prevail in less secure occupations.^{30,31} Nevertheless, these two aspects of labour market disadvantage independently retained significant and graded relationships to LLTI. The risk of illness rises with accumulations of both types of labour market disadvantage in a broadly similar way, although both have slightly different effects in different age groups.

A measure of accumulated labour market disadvantage is a useful indicator of experiences over the long term which place individuals at a higher risk of limiting illness. This is so even though the data contained in the ONS LS only show class and employment status at three discrete time points, and therefore possibly give conservative estimates of the differences between more and less disadvantaged people. These are relatively crude indicators, which can only give pointers to the precise mechanisms at work. The phenomenon of 'social reproduction', whereby one type of social or economic disadvantage increases the likelihood of others, is known from a wide range of other literature.^{32,33} Research using the 1958 British birth cohort study has shown that long or repeated spells of unemployment in young men were more likely to be experienced by those with disadvantaged circumstances in their family of origin, stretching back to childhood.³⁴ Unemployment early in working life, in its turn, increased the risk of disadvantaged social class, relatively low income and less favourable health behaviours at age 33.³⁵ Although the ONS LS is unique in its size and inclusion of all age groups, census information does not allow these kinds of mechanisms to be investigated in detail; however it is invaluable in confirming the broader patterns of accumulation in fully representative samples of the population.

Looking at individual measures of unemployment or disadvantaged social class shows that either experience does seem to 'cast long shadows forward' in the words of the Black Report.³⁶ This is relevant for the many policy initiatives presently aimed at decreasing health inequality. Short term improvements in health inequality may not prove easy to obtain in areas of large scale de-industrialization, where many citizens have experienced two decades or more of economic hardship and its social consequences.

KEY MESSAGES

- Unemployment and social class were closely associated in men in England and Wales across the years of working life at the censuses of 1971, 1981 and 1991.
- Most unemployed men did find work again but unemployment at any time point strongly predicted further unemployment at subsequent censuses.
- Being unemployed in 1971 or 1981 was associated with an increased risk of limiting long-term illness (LLTI) in 1991 independently of social class membership.
- Being in a semi- or unskilled manual social class (Registrar General's social classes IV or V) at any census was associated with illness in 1991 independently of employment history.
- The number of times a man was enumerated as unemployed or in social classes IV or V had a graded relationship to the risk of long-term illness.
- The relative risk of LLTI in men in semi- or unskilled occupations and who were unemployed and seeking work at the censuses of 1971, 1981 and 1991 was 4:1.

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