SOCIAL CLASS MIGRATION AND CHRONIC BRONCHITIS*

A STUDY OF MALE HOSPITAL PATIENTS IN THE LONDON AREA

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In England and Wales the standardized mortality ratios for bronchitis of both men and married women show a gradient from Social Class I to V, which is among the steepest found for any disease. Table I shows that this has been consistent since figures were first published (Registrar General, 1923, 1927, 1938, 1958a).

TABLE I
STANDARDIZED MORTALITY RATIOS FOR BRONCHITIS

Patients		Time Period (yrs)	Social Class				
Sex	Age (yrs)		I	II	III	IV	V
Males	20-64	1910-12	41	68	95	98	184
		1921-23	26	55	94	121	177
		1930-32	31	57	91	124	156
		1949-53	34	53	98	101	171
Married Women	20-64	1930-32	27	56	99	119	155
		1949-53	35	49	101	123	154

Morbidity studies by Logan (1960) have also shown a similar, though less steep, social class gradient.

These class differences are generally thought to be due to adverse factors associated with life in the lower social classes (Registrar General, 1938, 1958b; Vernon, 1939; Goodman, Lane, and Rampling 1953; Pemberton, 1953; Lane, 1954; Fletcher, 1956; Stuart-Harris and Hanley, 1957).

It is also possible that a drift down the social class scale of those disabled by bronchitis might contribute to the gradient in men, particularly the excess in Social Class V. A pilot inquiry by Public Health students at the London School of Hygiene and

Tropical Medicine supported this hypothesis and encouraged the study described in this paper.

METHOD

The effect that chronic bronchitis may have on a man's choice of job, and therefore on his social class, will be most apparent when the disease is advanced. For this reason hospital patients were chosen since they are a readily accessible group with advanced bronchitis. Changes in social class were studied by taking occupational histories; these were compared with the histories of patients with other diseases. This method of using hospital patients for epidemiological inquiries is similar to that exploited by Doll and Bradford Hill (1950) and other investigators in studies of lung cancer.

Six large hospitals in the London area were used for this inquiry, which was made during the first three months of 1960. All male patients aged 45 to 64 years with a diagnosis of chronic bronchitis were interviewed. In answer to standard questions, each of them had persistent cough and phlegm and had had one or more chest illnesses in the past 3 years. Thus they all came within the definitions of bronchitis used both by Higgins, Oldham, Cochrane, and Gilson (1956) and by Fletcher, Elmes, Fairbairn, and Wood (1959). No attempt was made to estimate a date of onset of the disease but the majority of the patients had a history of chest symptoms extending over many years. One-third of them had not worked for over 6 months; some had definitely retired on account of their bronchitis; others were hoping to return to work. After excluding those who had additional diagnoses, such as tuberculosis or bronchiectasis, 111 patients were left for further study.

Patients of the same age, and from the same wards, were interviewed as controls, those who had previously been in hospital with bronchitis being excluded.

* Based on a paper given to the Society for Social Medicine at Oxford on September 30th, 1960.

A broad classification of the diagnoses of this control group is given in Table II.

TABLE II
DIAGNOSES OF CONTROLS

Diagnosis	Number of Cases
Cardiovascular Disease:	
Coronary	23
Other	22
Gastrointestinal Disease	21
Pulmonary Disease (excluding Bronchitis) ..	21
Miscellaneous	24
Total	111

The case and control patients were of similar ages, a majority being in the older age groups (Table III).

TABLE III
AGE DISTRIBUTION OF BRONCHITICS AND CONTROLS

Age (yrs)	Bronchitics	Controls
45-	6	6
50-	17	17
55-	43	43
60-64	45	45
All Ages	111	111

There was little difference in the residential areas of the cases and controls but there were interesting differences in smoking habits; 10 years ago the patients with bronchitis were smoking more than the control patients, but at the time of interview they were smoking less and a greater proportion of them had given up smoking altogether.

In taking the occupational histories, an entry was made of the jobs done by each patient since leaving school. The main occupation of the father while the patient was at school was also recorded. A simplified version of an occupational history is given in the Figure (opposite).

The occupations were classified by social class (General Register Office, 1956a). The patients were then assigned to one of these social classes for each 5-year period of their working lives, starting backwards from the time of interview. If a patient had held jobs of differing social class during any 5-year period he was given the grading of the job (or jobs) held for the longest time during the period.

RESULTS

The changes in the social class of the controls and of the patients with bronchitis are given in Tables

IV and V. There is little movement from class to class for the control patients.

TABLE IV
SOCIAL CLASS DISTRIBUTION OF CONTROL PATIENTS
AGED 45-64 YEARS

Social Class	(a) Childhood*	(b) Working Life (Years Ago)					
		24-20	19-15	14-10	9-5	4-0	Now
I and II	21	20	19	25	26	25	23
III	59	64	71	61	60	61	62
IV	16	10	6	12	10	12	13
V	13	17	15	13	15	13	13
Unknown	2	—	—	—	—	—	—
Total	111	111	111	111	111	111	111

* Based on father's occupation.

TABLE V
SOCIAL CLASS DISTRIBUTION OF BRONCHITIC
PATIENTS AGED 45-64 YEARS

Social Class	(a) Childhood*	(b) Working Life (Years Ago)					
		24-20	19-15	14-10	9-5	4-0	Now
I and II	15	2	3	5	5	4	4
III	60	67	69	60	60	51	48
IV	21	17	20	21	22	23	24
V	12	25	19	25	24	33	35
Unknown	3	—	—	—	—	—	—
Total	111	111	111	111	111	111	111

* Based on father's occupation.

The apparent lack of movement among the control patients might have been due to those in a particular disease group, for example, coronary artery disease, moving up in social class while those in another moved down. This possibility was investigated by analysing each disease group separately; no significant change, up or down, was found in any of them.

On the other hand, there is considerable downward movement of the patients with bronchitis. This showed up in the last 5-year period and occurred principally in the older patients.

There was a slight increase in Social Class III for both groups of patients 19 to 15 years ago, that is, during the second world war: this is due to a rise in the number who served in the armed forces. All "other ranks" are allocated to Social Class III irrespective of social class at the time of call-up (General Register Office, 1956a).

The social class of a child was based on the main occupation of the father while the child was at school and may be taken as an index of early social

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A SIMPLIFIED EXAMPLE OF AN OCCUPATIONAL HISTORY (UP TO AGE 57)

AGE	YEAR	JOB	INDUSTRY	OCCUPATION CODE	SOCIAL CLASS	YEARS AGO (CLASS)
0	1903	Engine Driver (Father's occupation while patient at school)	Railway	631	III	
14	1917	Boy	Glass Works	936	V	
		↓				
		Wooden Box Maker	Wood Works	475	IV	
21	1924	Batch Mixer	Glass Works	079	III	
36	1939					24-20 (III)
						19-15 (III)
		Car Park Attendant	Car Park Contractors	669	IV	14-10 (III)
		Wooden Box Maker	Cycle Manufacturer	475	IV	
		Packer	Engineering Firm	909	IV	9-5 (IV)
		Cleaner (Sweeping Up)	Food Factory	876	V	
57	1960					4-0 (V) (Now V)

background. During this period there was an overall similarity in the social class distribution of the two groups of patients with a slight excess in Social Class IV and a deficiency in Social Classes I and II for the patients with bronchitis.

The social class distribution of those with bronchitis, 24 to 20 years ago, shows a drop in social class when compared with that of childhood (Table V). The control patients do not show the same drop between these two periods of time. This means that there are more bronchitic than control patients in the lower social classes in the earlier periods and that, as a group, those with bronchitis have had less opportunity for downward movement in recent years. If

a uniform age (say, age 30 years) is substituted for the time period 24 to 20 years ago, similar differences are apparent.

DISCUSSION AND CONCLUSIONS

There are economic and social factors unassociated with illness which influence social class movement. For example, technical advance is an important cause of the decreasing proportion of men in Social Classes IV and V reported in the 1951 Census (General Register Office, 1956b). At the same time the need for more technical knowledge and the speeding up of industrial processes may, in part,

explain the finding of Stein (1959) that the proportion of men in the lower social classes increases between the ages of 45 and 64 years. There is, however, no reason to believe that these factors have had very different influences on the two groups of patients in this study.

It has been shown that there was an increase in the number of bronchitic patients in the lower social classes, and that this occurred principally during the 5 years immediately before the interview in hospital. Since the control patients remained practically stable during this time it is likely that the job changes which accounted for this increase were caused by periods of sickness and increasing disability.

Hospital patients have been shown to differ from the total population in certain social characteristics (Registrar General, 1954; Abel-Smith and Titmuss, 1956). It is therefore probable that patients in hospital with bronchitis are not representative of all bronchitics and might undergo a different pattern of social class migration. However, it is suggested that a majority of men certified as dying of bronchitis before age 65 will have been in hospital with the disease at some time. Therefore the patients studied may not differ substantially from those on whom the Registrar General calculates the standardized mortality ratios for bronchitis.

It is also possible that, though at an advanced stage of their illness, some of those interviewed might on leaving hospital take on new jobs in different social classes. Thus the full extent of the changes in social class between the onset of chronic bronchitis and death may not have been recorded. Furthermore, the numbers of patients studied in some social classes are small.

For these reasons, though the data does support the original hypothesis, that bronchitics drift down the social class scale, no reliance can be placed on a quantitative estimate of the extent of the drift. The method by which such an estimate could be made is, however, given in the Appendix.

Though married women were not included in this study, their excess mortality in Social Class V cannot be due to this migration factor, as their social class is based, not on their own but, on their husband's occupation.

The drop in social class of the bronchitic patients between childhood and adult life is more difficult to explain. Despite the finding of Reid and Fairbairn (1958) that those who retired from the Post Office on account of bronchitis had had an excess of sickness absence from chest illnesses from the age of 15 years onwards, it is unlikely that the disease will have

caused changes in social class at this stage. The small group of younger bronchitics show virtually no drift down the social class scale. Furthermore, analysis of the older age group, going further back in time reveals little movement in earlier working life. It may be that there are factors in the make-up of a man which prevent his attaining the social class of his father which are also related to the development of bronchitis. Such factors were not considered in this study. The extent to which a man's personality and his social and occupational environment each contribute to the steep social class gradient can be more clearly defined only by a detailed epidemiological study outside the hospital.

This study as a whole does, however, illustrate the effect that chronic disease has on the work that a man can do during his lifetime, an effect which should not be overlooked when using mortality or morbidity data to study relationships between environment and chronic disease.

SUMMARY

Occupational histories were taken from 111 male hospital in-patients with chronic bronchitis and an equal number of control patients. The social class of each subject, in 5-year periods throughout his working life, was obtained from these histories. The bronchitic patients showed a drift down the social class scale, principally in the last 5 years before the interview in hospital, compared with the control patients. This change in social class was brought about by changes in occupation which were probably due to sickness absence and increasing disability. Similar changes may account for some of the excess mortality from bronchitis in Social Class V. The difficulties in calculating the extent of this drift are described. It also appeared that fewer bronchitic than control patients attained the social class of their fathers even in the first half of their working lives.

The pilot inquiry by Public Health students was of value in planning this study. Thanks are due to them and particularly to Dr. I. McIntosh. I am most grateful to the physicians of the Central Middlesex, Pinewood, St. Charles, St. Stephens, and Whittington Hospitals, and of Harefield Sanatorium for permission to interview their patients and to have access to hospital notes, and to all others in these hospitals who made this study possible. I should like to thank Prof. R. S. F. Schilling and Dr. C. H. Wood for their help and encouragement, Mrs. M. Jeffreys and Dr. L. Stein for helpful comments, and Dr. P. Armitage for statistical advice on the calculation given in the Appendix. The author was in receipt of a grant from the North-West Regional Hospital Board during the period of this study.

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APPENDIX

Method of Calculating a Correction Factor for Social Class Migration

(Factors influencing the validity of this calculation are described in the text)

The ratios of bronchitic and control subjects in each social class at the time of interview compared with 9 to 5 years ago is shown in Table VI.

TABLE VI

CALCULATION OF A CORRECTION FACTOR FOR SOCIAL CLASS MIGRATION

Social Class	Bronchitics			Controls			Ratio of (c ₁) to (c ₂)
	Time Period		Ratio of (a ₁) to (b ₁)	Time Period		Ratio of (a ₂) to (b ₂)	
	9-5 yrs ago (a ₁)	Now (b ₁)		9-5 yrs ago (a ₂)	Now (b ₂)		
I	1	1	1.00	3	3	1.00	1.00
II	4	3	1.33	23	20	1.15	1.16
III	60	48	1.25	60	62	0.97	1.29
IV	22	24	0.92	10	13	0.77	1.19
V	24	35	0.69	15	13	1.15	0.59

Ratios based on numbers of ten or less are shown in italics.

By applying the ratio for bronchitics, c₁, to the Registrar General's standardized mortality ratios for bronchitis, an estimate is obtained of the social class

distribution that would have prevailed among bronchitics at the time of death had there been *no change in social class after the development of the disease* (Table VII, Col. A).

TABLE VII

REGISTRAR GENERAL'S STANDARDIZED MORTALITY RATIOS FOR BRONCHITIS CORRECTED FOR CHANGES IN SOCIAL CLASS ASSOCIATED WITH THE DEVELOPMENT OF THE DISEASE

Social Class	S.M.R.	A		B	
		Ratio (c ₁)	S.M.R. Corrected by Ratio (c ₁)	Ratio (c ₁) to (c ₂)	S.M.R. Corrected by Ratio (c ₁) to (c ₂)
I	34	1.00	34.00	1.00	34.00
II	53	1.33	70.49	1.16	61.48
III	98	1.25	122.50	1.29	126.42
IV	101	0.92	92.92	1.19	120.19
V	171	0.69	117.99	0.59	100.89

Ratios based on numbers of ten or less are shown in italics.

However, allowance must be made for the changes in social class that take place in the whole population

in order to show what proportion of the changes occurring in the bronchitics is specifically associated with the development of the disease rather than to the general factors described in the text.

By applying a correction ratio, $\frac{c_1}{c_2}$, expressing the differential migration of bronchitics and controls, to the Registrar General's standardized mortality ratios for bronchitis, an estimate is obtained of the

social class distribution that would have prevailed among bronchitics at the time of death had there been *no excess migration associated with the disease after its development* (Table VII, Col. B).

It must be noted that hospital patients used as controls may differ, in their social class migration, from the whole population to a greater extent than hospital bronchitics differ from all bronchitics. Thus this final adjustment to the correction ratio introduces a further error not discussed in the text.