

# LIFE TABLES FOR SOCIAL CLASSES IN ENGLAND

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ONE of the pioneer accomplishments of Dr. William Farr was the first general tabulation of male deaths by occupation and age published in England by the Registrar-General in the report<sup>2</sup> for 1851. Subsequently such studies have been made in connection with every decennial census, usually for the three years centered around it. There has been a steady improvement both in scope and in quality which has made these reports a most valuable source of material for medical statisticians everywhere. The latest volume covering the triennium 1930 to 1932<sup>3</sup> was issued shortly before the outbreak of World War II. No census was taken in England in 1941. The next enumeration is due in 1951 and if it is not advanced to an earlier date new information on occupational mortality will not be available for another fifteen years. The data now at hand are therefore of unusually lasting interest.

In addition to publishing mortality rates for individual occupations the Registrar-General has also combined them for major social classes. The present paper is an attempt to summarize this latter type of information in the form of abridged life tables. In order to do so certain assumptions had to be made which will be described. It cannot be claimed, therefore, that these life tables are absolutely exact, but it is felt that they give a fairly accurate picture of class differences in mortality in England around 1931.

The Decennial Supplement gives in Table 4A census populations, numbers of deaths, and mortality rates for occupied and retired males in nine age groups—16 to 19, 20 to 24, 25 to 34, 35 to 44,

<sup>1</sup> The Johns Hopkins University School of Hygiene and Public Health.

<sup>2</sup> Fourteenth Annual Report of the Registrar-General of Births, Deaths, and Marriages in England. London, 1855.

<sup>3</sup> The Registrar-General's Decennial Supplement, England and Wales, 1931, Part IIa, Occupational Mortality. London, 1938.

45 to 54, 55 to 64, 65 to 69, 70 to 74, and 75 and over. Table 14 presents births, deaths under one year, and infant mortality for legitimate children by social class of father within occupational groups, and Table 17 has similar information for children between one and two years of age. The report also contains data on the mortality of married women by occupation of husband and of single women but not of widows and divorcees. This study is, therefore, confined to the male sex.

Table 1 of this paper presents the numbers of occupied and retired males aged 16 and over assigned to each social class. The original grouping of the Registrar-General has been deviated from in three points. Farmers, gardeners, agricultural laborers, and several categories of coal miners have been removed from Classes II, III, IV, and V, and appear as two separate classes. This was done because, as will be seen, the agricultural workers as a group have a very low and the coal miners a very high mortality and both groups are large enough to influence seriously the death rates of any class in which they are included. Furthermore both new classes are fairly homogeneous and quite interesting in their own right. The third deviation consists in the transfer of almost 700,000 clerks from Class III to Class II because it is felt that these white-collar workers should be combined with the employers, managers, and officials into whose

Table 1. Occupied and retired males, 16 and over, and per cent distribution by social class. England and Wales, 1931.

SOCIAL CLASS	MALES 16 AND OVER	PER CENT
I (Professional, etc.)	335,182	2.5
II (Intermediate between I and III) <sup>1</sup>	2,211,533	16.2
III (Skilled Workers)	5,313,129	38.9
IV (Intermediate between III and V)	1,560,583	11.4
V (Unskilled Workers)	2,239,738	16.4
Farmers, Gardeners, Agricultural Laborers	1,117,281	8.2
Coal Miners	868,523	6.4
TOTAL	13,645,969	100.0

<sup>1</sup> Almost 90 per cent of Class II are employers and managers in business and clerical workers.

ranks many of them will ultimately advance. It may be mentioned in passing that they had been counted in Class II by the Registrar-General in the preceding report<sup>4</sup> covering the years 1921 to 1923.

To make the social class life tables comparable to life tables for the general population it appears desirable to have them include all children born in and out of wedlock. Data on illegitimate births are available only by occupation of mother<sup>5</sup> and this tabulation is not very useful because 40 per cent of unmarried mothers were indoor domestic servants and 29 per cent without gainful employment. There is some reason to believe that the fathers of illegitimate children are spread much more evenly over the social classes. It was, therefore, decided to increase the death rate of legitimate male infants in each social class at a uniform ratio to allow for the higher mortality of the illegitimates. Only 4.5 per cent of all children were born out of wedlock in 1931 and the rates had to be increased by only 3.3 per cent. Following the same line of reasoning the mortality rates for legitimate male children between one and two years were uniformly increased by .9 per cent. Actually illegitimate births are more common on lower than on higher social levels, but the error introduced by the choice of a uniform ratio of increase is negligible.

No actual information is available for the years between the second and sixteenth birthday. Mortality, however, reaches its minimum during this period and the life table for the general population<sup>6</sup> gives for the male sex a probability of dying of only .0351 in fourteen years. Total removal of mortality in this age group would increase the complete expectation of life at birth by less than two years, doubled mortality rates would reduce the expectation by a somewhat smaller amount. It was, therefore, considered justifiable

<sup>4</sup> The Registrar-General's Decennial Supplement, England and Wales, 1921. London, 1927.

<sup>5</sup> Footnote 2, Table 15.

<sup>6</sup> The Registrar-General's Decennial Supplement, England and Wales, 1931, Part I, Life Tables. London, 1936.

to substitute reasoned guesswork for knowledge and to let the mortality of each social class deviate just half as much from the national average between two and sixteen years as was observed during the first two years of life. This assumption puts the mortality of Class I at 76 per cent, that of Class V at 115 per cent of the rate for all males and it is felt that it tends to reduce rather than overstate class differentials in mortality.

A further adjustment had to be made in the higher age groups. It has been known for some time "that statement on the Census Schedule of the former occupation of retired males tends to be omitted as life advances, whereas in death registration statement of the last occupation has nearly always been obtained, and the result is that at ages after 60 the population returned as never occupied is too large, and the populations of the occupied (and retired) are too small, to correspond with the deaths similarly classified."<sup>7</sup> This makes mortality rates at advanced ages appear spuriously high. The extent of the discrepancy can be estimated with great accuracy for the aggregate of all occupied and retired males. The mortality rate was reduced by .68 per cent for the decade 55 to 64 years, by 2.91 per cent from 65 to 69, by 6.18 per cent from 70 to 74, and by 11.24 per cent at 75 and over. These ratios were applied uniformly to all social classes.

The necessary adjustments of mortality rates having been made, abridged life tables were constructed by a combination of the Reed-Merrell method<sup>8</sup> and that described by R. R. Kuczynski.<sup>9</sup> Table 2 presents the numbers of survivors at exact ages and the complete expectation of life at birth. A radix of 1,000 rather than of 100,000 has been used and the expectation given to one decimal only in order to avoid the illusion of pseudo-accuracy. Data from the official

<sup>7</sup> Footnote 2.

<sup>8</sup> Reed, L. J. and Merrell, M.: A Short Method for Constructing an Abridged Life Table. *The American Journal of Hygiene*, September, 1939, 30, No. 2, Sec. A, pp. 33-62.

<sup>9</sup> Kuczynski, Robert R.: *THE MEASUREMENT OF POPULATION GROWTH*. New York, Oxford University Press, 1936.

AGE	I	II	III	IV	V	FARMERS, ETC.	COAL MINERS	ALL MALES
	Profes- sional, Etc.	Inter- mediate Between I and III	Skilled Workers	Inter- mediate Between III and V	Un- skilled Workers			
SURVIVORS AT EXACT AGES								
0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	100,000
1	961	947	935	924	910	938	905	92,814
2	956	941	924	910	890	930	886	91,394
16	930	913	893	877	854	900	850	88,186
20	916	904	885	868	845	894	838	87,245
25	901	891	871	854	830	882	822	85,824
35	876	865	843	824	799	858	789	82,885
45	838	822	800	771	747	824	739	78,357
55	759	738	719	677	654	762	658	70,041
65	605	576	568	520	503	641	518	54,899
70	484	450	451	402	391	538	400	43,361
75	349	303	312	264	258	402	264	29,665
COMPLETE EXPECTATION OF LIFE AT BIRTH								
0	63.1	60.8	60.0	57.3	55.7	63.0	55.7	58.74

Table 2. Survivors at exact ages and complete expectation of life at birth. Life tables for males by social class, England and Wales, 1930 to 1932.

English Life Table No. 10<sup>6</sup> for the years 1930 to 1932 are added for comparison.

Let us first turn to the data on complete expectation of life at birth. The five social classes designated by numerals present a very regular gradient. The expectation of life for agricultural workers appears virtually identical with that of Class I and the coal miners show the same value as do unskilled workers. The difference between the maximum and minimum values is 7.4 years. This is a little more than the increase in expectation of life observed in England as a whole between 1911 and 1931. Expressed in terms of European countries the difference is almost as large as between Scotland and Poland or between Denmark and Italy.

An interesting phenomenon is revealed by a more detailed comparison between Class I and the agricultural workers. The numbers of survivors are definitely higher for Class I in youth and early adult life but later the advantage shifts to the agricultural group. It seems that well-educated and well-to-do parents are most successful in preventing deaths among their children but that the people on the farms are either of sturdier stock or their mode of life is in the long run healthier.

In interpreting Table 2 the somewhat abstract nature of the figures should not be lost sight of. The life table technique has been applied to social classes which are not closed populations. Sons of professional men or coal miners do not always follow the careers of their fathers and also in later life shifts from one occupation to another across class lines are not uncommon. Such transfers, however, occur also between some of the geographical units for which life tables are customarily computed.

#### SUMMARY

Abridged life tables for males of seven large social classes are constructed from English mortality statistics for 1930 to 1932. The complete expectation of life at birth is found to range from 63 years for the highest class and agricultural workers to less than 56 years for unskilled workers and coal miners.