in accepted aetiological groups, and the old delineation into "lobar pneumonia" and "bronchopneumonia" was found unsatisfactory. The most useful classification was one based on the main presenting physical signs in the chest. Two broad clinical groups were noted—those with unilateral and those with bilateral physical signs. (*a*) Those with unilateral signs accounted for 43% of the total, and were further subdivided into three groups: those with signs of consolidation (12%), those with a local area of moist sounds (29%) and those with a pleural rub as the only sign (2%). (*b*) Those with bilateral signs accounted for 57% of the total, and were subdivided into two groups: those with diffuse rhonchi ("acute wheezy chests") (38%) and those with bilateral and diffuse moist sounds (19%).

In spite of the fact that there were facilities for special investigations in the pathological and radiological departments of local hospitals, in only 30% of the patients were blood counts, sputa tests, or *x*-ray investigations considered necesary.

Each practitioner recorded the treatment given. It is satisfactory to note that in 70% of patients sulphonamides and penicillin were considered to be adequate, and in a further 18% no specific antibacterial measures at all were thought necessary; in only 12% were the more potent and more dangerous antibiotics used—chloramphenicol in 7% and the tetracyclines in 5%.

Referral to hospital was deemed necessary in only 7% of patients, the great majority being managed by the family doctor at home.

The course of the illness was uncomplicated and straightforward in 88% of cases. In 9% there were complications, chiefly cardiac or pulmonary. The mortality rate was 3%.

Certain differences were apparent in the different geographical areas. Of the clinical groups, cases with local moist sounds were more frequent in rural areas (34%) than in urban (26%) or industrial areas (27%). The "acute wheezy chests" were most common in industrial (43%) and least common in rural areas (33%). The number of special investigations carried out was greater in the urban and industrial regions than in the rural. The doctor's therapeutic habits were also different, a greater proportion of drugs being given orally in rural areas—whether sulphonamides, penicillin, chloramphenicol, or tetracyclines. The hospital admission rates were the same in all areas.

Age influenced the distribution of the clinical groups. Cases with consolidation were most frequent in adults (16%) and least in infants (3%); those with local moist sounds were maximal between the ages of 5 and 9 (45%), and "acute wheezy chests" were found most often in infants (40%) and in adults over 44 (45%). Special investigations were carried out more often in adults (40%) than in children (10%). In children, sulphonamides were used least (21%) and oral penicillin most (40%). The hospital admission rate was greatest in infants under 1 (17%) and in patients over 64 (9%).

Further investigations will be undertaken into these conditions, in collaboration with specialists and consultants.

The 55 general practitioners who took part in this investigation were: H. W. K. Acheson (Staffs), P. S. Barclay (Norfolk), R. L. H. Barnard (Hants), R. W. Bazeley (Somerset), H. Bloom (Middlesex), A. S. Bookless (Surrey), W. K. N. Brown (Glasgow), A. Clein (London), R. N. Compton Smith (Essex), N. J. Cook (Bristol), J. C. C. Crawford (Belfast), M. Curwen (Kent), M. H. N. Dixon (Surrey), V. G. Doyle (Dublin), G. G. M. Edelsten (Hants), A. Elliott (Essex), E. O. Evans (Warwicks), J. F. Fleetwood (Dublin), G. R. Freedman (Co. Durham), H. W. C. Fuller (Hants), W. R. G. Gallagher (Dorset), J. M. Gill (Aberdeenshire), J. Goodall (Yorks), C. W. Grant (Perthshire), T. H. H. Green (Cheshire), D. W. Hall (Kent), D. A. Hamilton (Aberdeenshire), J. M. Henderson (Perthshire), J. Herbert-Burns (Dorset), P M. Higgins (Staffs), J. P. Horder (London), C. R. G. Howard (Hants), A. S. Jarman (Monmouth), F. E. B. Kelly (Leicestershire), C. A. Leeson (Leicestershire), H. Lindsay (Yorks), A. G. G. Long (Kent), E. G. L. Mark (Cheshire), K. G. Marshall (Yorks), E. L. Moll (Kent), J. G. Monro (Inverness-shire), A. J. Pearce (Warwicks), I. M. Scott (Kincardineshire), R. Simpson-White (Devon), A. Smith (Co. Durham), R. J. Stephen (Bristol), V. Winifred Symonds (Herts), G. Swift (Hants), G. M. T. Tate (Notts), C. W. Ward (Yorks), W. R. Waters (Lancs), G. I. Watson (Surrey), W. O. Williams (Glam), W. S. Wilson (Yorks), John Fry (recorder) (Kent).

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THE DURATION OF CHOREA

BY

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In many diseases the efficacy of treatment can be measured in terms of duration of symptoms, but this measurement presents many difficulties, even in a monosymptomatic disease such as chorea, where the date of starting is usually well documented and that of cessation definable to within a few days.

The biggest difficulty in this instance is to define duration so as to be able to use it for comparative purposes—for example, for comparing treatments. It is not enough for this purpose to say that it rarely lasts less than six weeks (Martin and Elkington, 1950) and for more than two months (Tidy, 1954). Osler (1894) gave an average duration of 8–10 weeks and a range of 2–26 weeks based on 554 cases in Philadelphia—rather similar to that given earlier in this country by the elder Heberden (1816): it is "seldom removed in less than one month and often resists all remedies for two or three and has been known to last a year." The arithmetic mean, the geometric mean, the median or the mode all describe one aspect of a population without describing its variability or its general symmetry of distribution. The range is not only a function of variability but also of the numbers observed.

Furthermore, both means and measures of dispersion are subject to the bias of selection, as indeed are all analyses based on hospital records, which underestimate the incidence of mild, short, or shortly fatal illnesses. Thus as Bywaters and Dresner (1952) have shown for rheumatoid arthritis, the prognosis for those attending hospital within a year of onset of the disease is better than for those attending after that time, simply because the latter are only partly representative of the original

group, many having got better within the year without attending hospital. In an opposite sense, the earlier patients with myocardial infarction are seen the worse the prognosis, but only very few of those in whom the earliest deaths occur are ever admitted to hospital. This principle was recognized by Graham (1928) in a study of the effect of arsenic in chorea: he divided his 45 cases into three groups according to duration of chorea

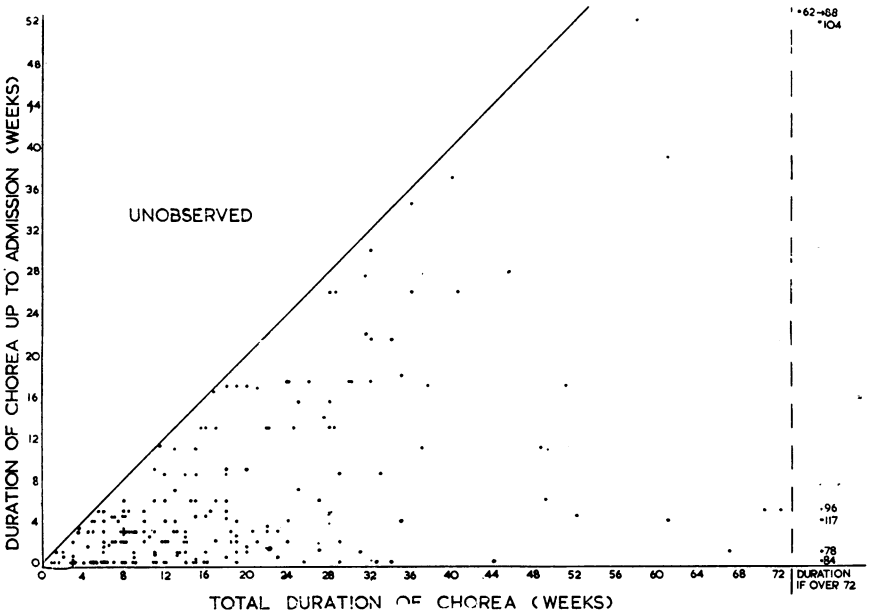

FIG. 1

on admission (0–30, 30–60, 60–90 days) and concluded that there was little difference between the effect of arsenic and of salicylate on duration.

In this study of the duration of chorea a technique has been used correcting partially for this self-selection bias; it is based on the life-table method previously described (Dixon and Bywaters, 1952).

Method

The course of the illness, as evidenced in this instance by the presence of choreic movement, is divided into a number of equal time-periods, from the onset onwards. If the period is chosen to include a sufficient number of patients, the recovery rate for each period will be the number of patients who recover during the course of the period divided by the number who were under observation during the whole of it. Patients who are admitted less than halfway through the period or more than halfway through the preceding one have been under observation, as a group, for the whole of the period, and therefore form the denominator of the recovery rate for the period. On the other hand, patients admitted at the onset of the disease, less than halfway through the first period, are observed as a group for only three-quarters of the allotted time. This initial recovery rate is thus undercorrected (although a rough correcting factor of one-third might be added if desired). In estimating early recovery rates, patients who are admitted at later stages of their illness must be ignored because they are selected representatives for a group whose early recovery rate is not known.

In the later stages of recovery, the error due to diminishing numbers may make it preferable to consider the recovery rate for several periods together. In the present study this has been estimated approximately, by dividing the total number of recoveries in several periods by the maximum number under observation during this time. A fresh attack of chorea was defined as one that followed a symptom-free interval of three months or more. If the definition of a fresh attack had been altered to one that followed a symptom-free period of one month or more, three attacks which we considered as lasting 31½, 72, and 67 weeks respectively would be interpreted as six attacks lasting 8½ and 12, 13 and 47, and 16 and 40 weeks respectively.

In its more general applications, the accuracy of this method may be limited by the availability of early cases, as, for instance, in coronary thrombosis as mentioned above. An accurate solution may then depend on extending the analysis backwards, either by including all cases that have involved a particular ambulance service, or by combining the resources of hospital and general practice in one analysis.

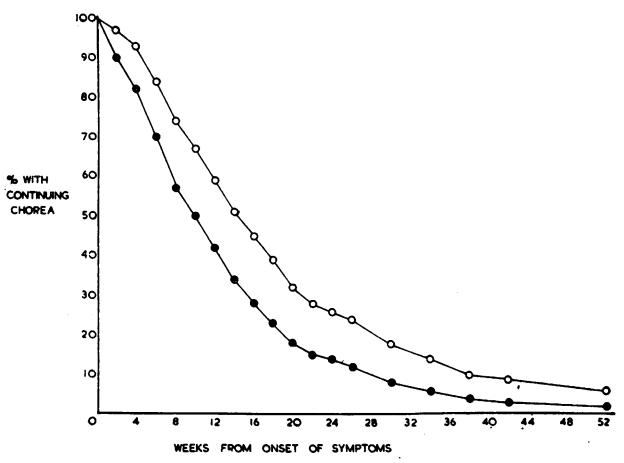

FIG. 2.—Recovery rate in 206 cases of chorea. ——O From line 24 of Table II, divided by the number still choreic at beginning of appropriate period. ——● is plotted for a population of 100, subject to recovery rate shown in line 25 of Table II.

Materials and Results

We have analysed the duration of 206 attacks of chorea occurring in 170 consecutive patients, in each of whom the diagnosis was confirmed after admission by two or more observers. Five choreic patients were excluded because of death after 7, 9, 16 days, and 12 and 15 weeks of chorea; one died with severe chorea and hyperpyrexia, and four with rheumatic carditis while still choreic. Of the 206 cases, 36 were either admitted within 24 hours of the onset or else developed chorea in the ward after being admitted with rheumatic fever, the shortest lasting one week and the longest 117 weeks (1 day and 114 weeks after admission). Means, etc., are shown in Table I.

TABLE I.—*Means*

Arithmetic mean	19·2 weeks
Median	15 ,,
Mode	8 ,,
Geometric mean	13·7 ,,
Range	1–117 ,,
Range under observation	1 day–114 ,,

The results of the analysis are expressed in Fig. 1 and Table II. Fig. 2 shows the recovery rate for 206 cases of chorea and for a population of 100, using both the present method of analysis and a standard technique.

Discussion

The initial recovery rate in chorea remains undercorrected in the present study. Furthermore, we have excluded a few patients who were said to have recovered before the diagnosis of chorea was confirmed by two observers in hospital. Thus our corrected rate for recovery from chorea (Fig. 2) is conservatively estimated. It shows not a sinusoidal curve with a delayed maximal rate of recovery but a curve which is almost exponential and is steep at the onset.

From this analysis it may be seen that chorea has no defined minimum or maximum duration and that from the moment the diagnosis is proved the recovery rate is rapid. This suggests that such rapidly recovering or abortive attacks may be quite common although unrecognized: if these are accompanied by cardiac involvement this might account for some of those 50% of mitral stenosis patients who give no history of previous rheumatic fever.

Summary

The duration of chorea was measured in 170 patients suffering 206 attacks (five patients were excluded from this because they died between 1 and 15 weeks from onset of chorea, four with rheumatic carditis and one with hyperpyrexia). The mean duration was 19 weeks, the geometric mean 13.7 weeks, and the range between 1 and 117 weeks. This and other modes of expressing duration are considered unsatisfactory in a mixed group of

TABLE II.—*Analysis of the Duration of Chorea in 206 Cases (170 Patients)*

Line	Column 1 Duration of Chorea up to Admission (Weeks)	Column 2 No. of Cases Admitted in Each Group of Column 1	Column 3 Number of Cases Still Choreic after so many Weeks from Onset																										No. of Weeks for Remainder
			2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	
1	Up to 1 week	59	53	46	39	36	32	26	21	15	14	10	10	9	8	8	7	6	4	4	4	4	4	3	3	3	3	3	67, 78, 84
2	> 1 up to 3	50		48	42	31	25	20	14	14	13	8	4	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	
3	> 3 ,, ,, 5	32			26	20	17	16	14	13	9	8	8	7	7	7	7	7	7	6	6	6	6	6	6	6	6	5	61, 70, 72, 96, 117
4	> 5 ,, ,, 7	11				10	10	8	7	5	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	—	—	
5	> 7 ,, ,, 9	9					9	7	6	5	3	2	2	2	2	2	1	1	—	—	—	—	—	—	—	—	—	—	
6	> 9 ,, ,, 11	3						3	2	1	1	1	1	1	1	1	1	1	1	1	—	—	—	—	—	—	—	—	
7	> 11 ,, ,, 13	9							8	6	5	5	3	3	3	2	1	1	1	—	—	—	—	—	—	—	—	—	
8	> 13 ,, ,, 15	2								2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	—	—	
9	> 15 ,, ,, 17	5									4	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	—	
10	> 17 ,, ,, 19	11										8	8	7	4	4	3	2	2	1	—	—	—	—	—	—	—	—	
11	> 19 ,, ,, 21	0											—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
12	> 21 ,, ,, 23	4												4	4	4	3	1	—	—	—	—	—	—	—	—	—	—	
13	> 23 ,, ,, 25	0													—	—	—	—	—	—	—	—	—	—	—	—	—	—	
14	> 25 ,, ,, 27	4														3	2	2	2	1	1	1	—	—	—	—	—	—	
15	> 27 ,, ,, 29	0															—	—	—	—	—	—	—	—	—	—	—	—	
16	> 29 ,, ,, 31	1																—	—	—	—	—	—	—	—	—	—	—	
17	> 31 ,, ,, 33	0																	—	—	—	—	—	—	—	—	—	—	
18	> 33 ,, ,, 35	1																		—	—	—	—	—	—	—	—	—	
19	> 35 ,, ,, 37	1																			1	—	—	—	—	—	—	—	
20	> 37 ,, ,, 39	1																				1	1	1	1	1	1	1	61
21	Others	3																											58, 88, 104
22	Totals	206	53	94	107	97	93	80	72	61	54	51	44	43	38	36	29	25	21	17	15	15	14	13	13	13	11	9	
23	Total exposed up to middle of each fortnightly period in Col. 3 = No. still choreic + No. newly admitted		59	103 (53 +50)	126 (94 +32)	118	106	96	89	74	66	65	51	48	43	38	40	29	26	21	18	16	16	14	13	13	13	11	
24	Total recovering by end of each 2 week period (Lines 23–22)		6	9	19	21	13	16	17	13	12	14	7	5	5	2	11	4	5	4	3	1	2	1	—	—	2	2	
25	Probability of recovery (total in Line 24 ÷ No. exposed—derived from Line 23)		·10	·09	·15	·18	·12	·17	·19	·18	·18	·22	·14	·10	·12	·33 (weeks 28–30)		·33 (weeks 32–34)		·36 (weeks 36–38)		·19 (weeks 40–42)		·39 (weeks 44–52)					

patients coming in at varying intervals from onset, and a life-table technique is applied, relating the recovery rate at any given stage of the disease to the patients under observation at that time. Thirty-six patients were either admitted within 24 hours of the onset or developed chorea under observation in the hospital. From the moment the diagnosis was proved the recovery rate was rapid, suggesting that rapid recovery and abortive attacks may be quite common and possibly unrecognized.

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THE DISTRIBUTION IN ENGLAND AND WALES OF MORTALITY FROM CORONARY DISEASE

BY

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The rapid rise of mortality attributed to coronary disease during the past 30 years has been one of the chief features of the vital statistics of England and Wales. In 1921 the numbers of deaths ascribed to angina pectoris were 743 males and 343 females; during the next ten years they rose to 4,118 males and 1,766 females in 1930. In 1931 the description of these deaths was altered to "diseases of the coronary arteries, angina pectoris," and 4,565 males and 2,063 females were included in the category. By 1939 these numbers had risen to 12,959 males and 6,537 females. In 1940 diseases of the coronary arteries were tabulated separately, but a severe break was made in the continuity of classification by the Registrar-General's adoption of the physician's preference when more than one cause of death was mentioned on the death certificate in place of the previous rules of allocation. Under this revision the deaths attributed to coronary disease in 1940 were 10,648 males and 5,605 females. The numbers continued to rise in the succeeding years, and in 1954 the deaths assigned to this cause reached 41,688 males and 23,983 females.

The extent to which this rise in mortality from coronary diseases can be accounted for in terms of changes in fashion of diagnosis, in changes in the method of classification, and to the ageing of the population has been discussed by Ryle and Russell (1949) for the period 1921–39. They concluded that since the rise in mortality had occurred in all age groups it was not likely that more accurate diagnosis of deaths previously attributed to "old age" was a factor of importance. They also concluded that transference of deaths from other heart conditions to coronary disease was unlikely to have been responsible for more than a small fraction of the increase in the latter.

An interesting feature of the mortality in earlier years has been the distribution by social class, the highest class having the largest death rate. The rates for the five classes in 1930–2 are shown in Table I. From the 1% sample of the 1951 Census it would appear that the large increase in mortality since 1931 has considerably affected the social class differential. The results obtained from the 1% sample are shown in Table II. An interesting feature of this analysis is the reverse relationship between the standardized mortality ratio and the social class of males and married women. The wives of the males in the social class with the largest risk have themselves the lowest risk.

TABLE I.—*Standardized Mortality Ratio from Coronary Disease; Males Aged* 35–64 (1930–2)

Social Class (and Main Components)	Standardized Mortality Ratio
I (Professional)	237
II (Intermediate)	148
III (Skilled workers)	95
IV (Intermediate)	66
V (Unskilled labourers)	67
All males, aged 35–64	100

TABLE II.—*Arteriosclerotic (Coronary) Heart Disease, Standardized Mortality Ratio; Males Aged* 20–64 *and Their Wives* (1951)

Social Class	Standardized Mortality Ratio	
	Males	Wives
I	150	92
II	110	93
III	104	101
IV	79	100
V	89	108

The trend of mortality from coronary disease in recent years is shown in Table III. It will be seen that in each age group over 35, and in each sex, the death rates have steadily increased during these 15 years. The rise in mortality is, however, correlated with age, showing a twofold increase in the youngest age group, rising to a threefold increase in old age. The disparity between the sexes is most marked at the younger ages, when the male death rate is five to six times that of the female; the ratio then declines to less than twice that in old age.

Geographical Distribution of Mortality

In 1950 and in subsequent years the Registrar-General has published deaths from "coronary disease, angina," separately for the main divisions of the country. With the publication of the population at risk provided by the Census of 1951 it has become possible to examine the regional distri-

TABLE III.—*England and Wales. Death Rates per Million from "Coronary Disease, Angina"*

Ages	Males			Females			Sex Ratio of Death Rate (M/F)			Ratio of Death Rates 1950–4/1940–4	
	1940–4	1945–9	1950–4	1940–4	1945–9	1950–4	1940–4	1945–9	1950–4	Males	Females
35–	124	189	290	23	29	41	5·4	6·5	7·1	2·3	1·8
45–	607	945	1,455	118	177	251	5·1	5·3	5·8	2·4	2·1
55–	1,687	2,764	4,405	504	795	1,261	3·3	3·5	3·5	2·6	2·5
65–	3,314	5,455	9,737	1,522	2,519	4,406	2·2	2·2	2·2	2·9	2·9
75+	4,928	8,170	15,645	2,741	4,628	9,148	1·8	1·8	1·7	3·2	3·3