

Child Life Investigations

Social Conditions and Acute Rheumatism

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Preface

This Report gives the results of an investigation into the relation between social conditions and acute rheumatism in children which was organized by the London Committee for Child Life Investigation, under the chairmanship of Dr. G. F. Still.

Of acute rheumatism in children, one of the few things certainly known is that it is commoner among the classes from which hospital patients are drawn and rarer among the well-to-do. In his introduction to the Report, Dr. Still points to this fact and gives some fresh illustrative evidence for it. This incidence of the disease gave hope that in the absence of any secure knowledge of its causation we might gain some indication of means for its prevention or reduction by careful study of the particular conditions of environment that might be found to have special relationship to it. As Dr. Still urges, the sufferings of children from heart disease after rheumatism make any effort to discover means, of prevention worthwhile, apart altogether from the heavy economic loss which the community suffers from this cause.

The principal series of rheumatic cases, and of non-rheumatic cases, for control, was investigated at St. Thomas's Hospital, London, under arrangements made by Dr. J. S. Fairbairn and Dr. O. L. V. de Wesselow. The children were examined by Dr. C. K. J. Hamilton and Dr. J. Forest Smith, for whose voluntary help the Council were much indebted. Inquiries into the social history were made concurrently by M. Forest Smith. A second series was examined by Dr. F. J. Benjamin, working under Dr. Still at the Hospital for Sick Children, Great Ormond Street, London, the social inquiries here being made by Miss Little. For comparison a further group was investigated in Scotland by Dr. Margaret F. Lowenfeld and Dr. H. W. Sutherland, working under Professor Leonard Findlay at the Royal Hospital for Sick Children, Glasgow. Finally, a supplementary inquiry into rheumatism in Poor Law Schools was made by Dr. Benjamin.

It needed no small amount of skill and painstaking to reduce the mass of observations made by the three groups of observers to a connected Report; this task

has been accomplished with admirable tact and care by Mrs. M. Forest Smith. In the work of drawing up the report Dr. J. Brownlee and Dr. Matthew Young, of the Council's Statistical Department, have helped in the arrangement of the tables and have tested the statistical significance of the results. Throughout the entire investigation the aid given by Dr. de Wesselow has been invaluable.

Thanks are due also to Dr. J. A. Glover, of the Ministry of Health, for his help in obtaining figures and information as to buried rivers and old watercourses; and to the Medical Officers of Health for the Boroughs of Lambeth, Battersea, Wandsworth, Camberwell, Deptford, Southwark, Bermondsey and Wimbledon, for the large amount of work done by their Sanitary Inspectors in visiting the homes and recording the measurements and sanitary conditions of the houses occupied by the St. Thomas's Hospital patients. The arrangements for the inspection of the Poor Law Schools were kindly made by the Ministry of Health; and to the Guardians of Greenwich and Deptford, Bermondsey, Hackney, Wandsworth, and Lewisham. to whom the schools in question belong, as well as to the Superintendents and Medical Officers of the Schools, who placed their time and help at the disposal of the investigator, the Council are also much indebted.

The inquiry has given provisional answers to several interesting and important questions; this is a valuable result even though many of the answers are of a negative kind. The influence of its results upon our outlook is discussed generally by Dr. Still in the chapter of conclusions he has been good enough to contribute. Of all the facts collected none other any conclusive evidence that the disease is propagated by infection, though they are in general consistent with infection by a specific causative agent. It seems improbable that much further progress can be made until means have been discovered by which this agent can be satisfactorily identified and studied. The inquiry now reported does not give it must be admitted, any clear indication of lines of tuition along which we might attain preventive control over this cruel and wasteful disease of childhood. While this is unhappily true we do know well, nevertheless, that the painful and crippling after insults of heart disease that follow the rheumatic infection in so many instances can be prevented or mitigated by proper rest and care. We know that practically every one of the children. over 700, included in this Report. like all the rest of their very numerous fellow sufferers, represents an urgent demand for

prolonged, special, and continuous treatment during a period of several months for the protection of the heart from damage. and that in the great majority of these cases this need has not been satisfied and, in the absence of proper organisation, could not be satisfied. This elementary demand. long ago obvious, is strengthened by facts brought out in this investigation, for if, as it appears, the disease tends to attack more than one member of the family this throws a greater burden on the mother and makes home treatment even more difficult than before in a poor home. It is possible also that removal of the first case until convalescence is complete might remove the source of infection. though this is a more doubtful point. The plain need. for organized after-care offers an urgent but soluble problem of preventive medicine. too long neglected, and every motive of humanity and wise economy should impel the community to provide this after-care as rapidly as possible.

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Introduction

By G. F. Still, M.D., D.R.C.P.

The chief object of the inquiry which forms the basis of this Report was to find out if possible the cause or causes which determine the special incidence of acute rheumatism upon children of the hospital class. It was thought that these children suffer from rheumatism so much more frequently than do the children of the well-to-do that there must be some aetiological factor which, if not peculiar to the poorer classes, is at any rate much commoner among them, and that, if this could be discovered, not only might light be thrown upon the causation of this very serious disease, but also some steps might be taken for its prevention amongst the class which it most affects.

The term Rheumatism is used in this Report to indicate only the disease which is sometimes known as Rheumatic Fever or Acute Rheumatism with its recognized manifestations, chorea, organic heart affection, and nodules. Nothing but confusion is introduced into the subject if symptoms of doubtful origin are accepted as evidence of rheumatism, such as the vague aches and pains which are not uncommon in childhood and which lead to no such results as acute rheumatism does, or tonsillitis, which may indeed be the starting-point of rheumatism but by itself is no proof of rheumatism. Still less can any of the various forms of rheumatoid arthritis, by whatever name they go, be included in a report on rheumatism, for there is no reason to suppose that they have any connexion with this disease.

Probably most clinicians with sufficient experience both of practice amongst the well-to-do and of work at a children's hospital would agree that, so far as their impressions go, there is a striking difference between the incidence of rheumatism on the children of the well-to-do and that on children of the hospital class. It would seem, however, that no statistical comparison of the two classes has been made, so that actual proof has been lacking. The following statistics are submitted as evidence that such a difference exists, though it is quite possible that larger figures might modify in one direction or another the degree of the difference. In the Children's Out-Patient Department of King's College Hospital, where only children up to 10 years of age are

treated, there were, amongst 1,000 consecutive cases, 229 children between 6 and 10 years old: out of these 229 cases, 13.1 per cent. showed evidence of acute rheumatism (3-5 per cent. joint symptoms, and the rest heart-affection or chorea).

In a private practice dealing almost exclusively with the well-to-do, there were, amongst 700 consecutive cases between the ages of 6 and 10 years, 5 cases of acute rheumatism (2 of joint affection, 2 of endocarditis, and 1 of chorea), so that less than 1 per cent. (0.7 per cent.) showed evidence of rheumatism. Such a large difference as this can hardly be accidental, and the explanation of it is a matter of great practical importance. Various possibilities suggest themselves. If rheumatism is due to bacterial infection, conveyance of infection from person to person, as happens in tuberculosis, might be possible, and the special incidence upon the poorer classes might then be explained by the closer contact involved in small rooms and crowded dwellings: lack of cleanliness and verminous conditions might also favour the occurrence of infection. There is also the possibility that catarrhal infections of the throat, though common in all classes, may be commoner amongst the poor than amongst the well-to-do, and that infection by this route may therefore be commoner amongst the hospital class. If again rheumatism is related to exposure to cold or damp, some greater liability to these might explain the incidence of the disease upon the poorer class.

In considering these and other possibilities it seemed worthwhile to make a thorough investigation of the conditions under which rheumatism arises, the parentage, the family incidence, the environment, especially as to housing, clothing, and cleanliness, also the physical characteristics of the children affected, especially as regards the state of the throat.

It was not practicable to obtain for comparison any sufficient statistics on similar lines from families of the well-to-do, so it was decided to check the results obtained as far as possible by comparison with non-rheumatic families of the hospital class. In some respects this standard of comparison is the more valuable as the conditions in common are so many that any divergence in particular points would be the more noticeable.

The question of most practical importance is whether rheumatism is infectious, and if so, whether it is carried by persons, by fomites, by dwellings, or in any other preventable way.

Most of the statistics and observations contained in this Report are directed especially to the solving of these problems, and they show that there is at least a ground for suspecting that rheumatism can be conveyed in some way from person to person, and that, as might be expected, closeness of contact favours its transmission. Whether this is the usual mode of infection, or even whether it is a common one, does not appear from the facts collected: moreover, even if it were accepted as proven, we have still no information as to the mode of transmission. Until there is more certainty about the bacteriology of rheumatism it is hardly likely that the exact mode of transmission will be determined.

The importance of ascertaining this point can hardly be exaggerated. Rheumatism is a common disease amongst children of the hospital class perhaps, as the Report seems to show, more frequent amongst the children of the poorer middle-class than amongst the poorest and destitute.

According to the Annual Report for 1924 of the Chief Medical Officer of the Board of Education, there were, amongst the children medically examined in the public elementary schools of the London area, 1,548 children with organic heart disease, which in children of the school-age means in nearly all cases rheumatic heart disease. Figures are not available to show the incidence of rheumatism upon the children in the public elementary schools throughout the country, but in particular areas it has been shown that 10-15 per cent of the children at 12 years of age are affected by rheumatism. The average number of children attending these schools is about 5 millions, so that the number who develop manifestations of rheumatism at some time during their school course must be very large, and in view of the special tendency for rheumatism in childhood to affect the heart, the number of children with rheumatic heart disease in the country must also be very large. Statistics of children examined in the elementary schools at the 'leaving age', i.e. 12 years, furnish evidence of some value as to the incidence of this disease upon children of this social class, for the onset of rheumatism is mostly between 6 and 12 years of age.

It is difficult to get exact information as to the proportion of rheumatic children that develop heart disease. Hospital statistics have placed it as high as even 50 per cent, but as hospitals are likely to deal with the severer cases, this estimate may be high. Certainly a large proportion of the children affected by rheumatism develop some form of heart disease, which if it does not end fatally, as it often does within a few years, may leave the child more or less incapacitated for the ordinary occupations of life. In girls, and less frequently in boys, recurring attacks of chorea may hinder their education for a long time and often lead on to heart disease if this is not already present. Apart from the economic injury inflicted by rheumatism, the sufferings of the children with advanced heart disease make any effort to discover methods of preventing rheumatism in childhood worth the undertaking.

II. The Data and Method of Investigation

The data on which this investigation is based consist of the medical and social histories of 721 families containing at least one child who is, or has been, under treatment for rheumatism. Of these, 121 histories were compiled at the Children's Hospital, Great Ormond Street, London, 200 at the Royal Hospital for Sick Children, Glasgow, and 400 at St. Thomas's Hospital, London.

For comparison with these families (who will be termed throughout the Report 'the rheumatic families'), the histories of 200 families each containing a non-rheumatic child under hospital treatment were investigated, 100 at the Royal Hospital for Sick Children, Glasgow, and 100 at St. Thomas's Hospital, London. These families were selected only in the respect that each contained a child attending the hospital for a non-rheumatic disease and will be termed 'control families.'

In addition, the rheumatic histories of some 2,000 children residing in Poor Law Schools were ascertained.

Though uniform cards were used, the method of investigation differed somewhat in detail in the three centres. A brief account of the procedure at each centre may be given:

1. The Children's Hospital, Great Ormond Street, London

At this hospital the medical inspections were made by Dr. Benjamin both at the Hospital and in the homes, but the social inquiries were carried out by Miss Little, who visited the home in every case. The data consisted of cases taken from the In-Patient and Out-Patient records of the Hospital during the five years preceding March 1924, a small number being provided from the Out-Patient Department. All the cases had had chorea, rheumatic carditis, or rheumatic fever, acute or subacute. The selected cases were all taken from those areas north of the Thames which were accessible by bus or tram within three-quarters of an hour from the Hospital.

2. The Royal Hospital for Sick Children, Glasgow

At this Hospital, 200 cases of undoubted rheumatism were taken from the In-Patient and Out-Patient records, and the family and home conditions investigated, in accordance with the schedule provided for the purpose, by Dr. M. Lowenfeld and Dr. Hector Sutherland, each of whom took 100 cases.

The conditions of 100 children coming from the same social strata and living in the same districts as the rheumatic children, but under treatment in the Hospital for such diseases as pneumonia and acute nephritis were investigated in a similar manner, as controls. The inquiry was made in all these cases at the home of the patient, visits being repeated until all available members of the family had been seen.

3. St Thomas's Hospital, London ST. THOMAS'S HOSPITAL, LONDON.

At St. Thomas's, 400 children drawn from the Rheumatism Clinic, all actually under In-Patient or Out-Patient treatment at the time of the investigation, and most of them still under observation, were selected for investigation by Dr. Forest Smith and Dr. Hamilton, each of whom examined 200 families. These were referred to the social worker, Mrs. M. Forest Smith, who visited the homes, recorded the social details and made arrangements for the attendance at Hospital for medical examination of as many of the family as could attend. All previous notes relating to the different members of the family were looked up and utilized to confirm the histories given. In some cases

the families had been known for two generations and the medical and social notes reached back for many years. In addition, a housing schedule was sent out to the Medical Officers of Health of the district in which each case resided and the measurements of the rooms, the state of the houses, foundations, &c., were recorded by the Sanitary Inspectors.

The 100 non-rheumatic children were selected by Dr. Forest Smith and Dr. Hamilton from the children attending the Out-Patient Department entirely at random except as regards age and freedom from suspicion of rheumatic disease.

III. The Incidence of Rheumatism in Rheumatic and Control Families

In order to demonstrate the incidence of rheumatic disease in the families under review, the actual number of persons concerned has been enumerated, and the following is an account of the numbers comprising the total families investigated at each Hospital, together with the number of persons in these families believed to have had acute rheumatism, chorea, or rheumatic carditis.

1. Living Children

The number and sex-incidence of the living children have been compiled from the case-papers, whereon were recorded the particulars of members of the family as stated by the mother. The figures relating to the families to which the rheumatic patients belonged are shown in Table 1 and those relating to the control families in Table 2.

Table 1

Showing the number of living children over two years of age in the families of which the rheumatic patients were members.

<i>Hospital centre.</i>	<i>Patients.</i>			<i>Siblings.</i>			<i>Total persons.</i>		
	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>
C.H.G.O.S.* . .	46	75	121	141	177	318	187	252	439
R.H.S.C.G. . .	72	128	200	340	359	699	412	487	899
S.T.H. . . .	180	220	400	586	565	1,151	766	785	1,551

* Note – In this and subsequent tables.

C.H.G.O.S. represents The Children's Hospital, Great Ormond Street, London

R.H.S.C.G. represents The Royal Hospital for Sick Children, Glasgow

S.T.H. represents St Thomas's Hospital, London

Table 2.

Showing the number of living children over two years of age in the control families at the Royal Hospital for Sick Children, Glasgow, and St. Thomas's Hospital.

<i>Hospital centre.</i>	<i>Patients.</i>			<i>Siblings.</i>			<i>Total persons.</i>		
	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>
R.H.S.C.G. . .	64	36	100	191	171	362	255	207	462
S.T.H. . . .	47	53	100	137	133	270	184	186	370

Reliable information as to the number, and more especially the ages, of children who had died was difficult to obtain. In many cases differing statements were made“ by the mothers at separate inter- views ; in some cases where 4, 5, 6 or even more children had died in infancy, recollection of their ages at and the cause of death was indistinct. The histories of the families of rheumatic patients are probably more complete in this respect than those of the controls, it being more difficult to make the mother realize the importance of precise information in the latter type of family. There was no record in the control families of any child having died of the effects of rheumatic

disease, nor of any rheumatic history among the dead children.

The number of children who were stated to have died at all ages in the families from which the rheumatic patients came was as follows:

At the Children's Hospital, Great Ormond Street . . 74

At the Royal Hospital for Sick Children, Glasgow . . 156

At St. Thomas's Hospital . . 2.62

Of these dead children (the majority of whom appear to have died under 5 years of age) the following had history Of definite rheumatism : At the Children's Hospital, Great Ormond Street, 6, of whom 4 were said to have died from the effects of the disease. At the Royal Hospital for Sick Children, Glasgow, 5, all of whom are/said to have died from the effects of acute rheumatism. At St. Thomas's Hospital, 9, Of whom 8 appear to have died as a direct result of acute rheumatism.

3. The number of cases of Rheumatism found among the living brothers and sisters of the rheumatic and control patients

Although a case may have shown more than one manifestation of rheumatism, each patient has only been counted once and classified ' according to the outstanding manifestation recorded. The figures giving the incidence of the different types relating to the families of the rheumatic patients are shown in Table 3, and those relating to the control families in Table 4.

At the Children's Hospital, Great Ormond Street, all but 30 of the siblings of the rheumatic patients were actually examined by the Medical Officer. At the Royal Hospital for Sick Children, Glasgow, 118 were not examined owing to absence from home, &c. At St. Thomas's Hospital, owing to the fact that the medical examinations were carried out in hospital, 537 of the brothers and sisters of the rheumatic children and 117 of the siblings of the control cases were not actually examined. The mother was carefully questioned as to the rheumatic history of those children whom it was found impossible to examine, and the incidence of rheumatic disease among them is shown in Table 5, together with that found among those actually examined. The

incidence of rheumatism was 10.6 per cent. in those examined medically and 13.0 per cent in those whose history was ascertained by interrogation. The difference, 2.4 per cent., is not significant.

Table 3

Showing the number of cases of rheumatism in its different manifestations found among the living brothers and sisters of rheumatic patients at the Children's Hospital, Great Ormond Street, the Royal Hospital for Sick Children, Glasgow, and St. Thomas's Hospital.

<i>Hospital centre.</i>	<i>Type of Rheumatism.</i>									<i>Total nos.</i>		
	<i>Acute rheum.</i>			<i>Chorea.</i>			<i>Rh. carditis.</i>			<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>
	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>			
C.H.G.O.S.	6	1	7	4	6	10	1	3	4	141	177	318
R.H.S.C.G.	6	6	12	1	4	5	3	6	9	340	359	699
S.T.H.	28	25	53	16	31	47	16	19	35	586	565	1,151

Table 4

Showing the incidence of rheumatism in its different manifestations on living brothers and sisters of the control cases at the Royal Hospital for Sick Children, Glasgow, and St. Thomas's Hospital.

<i>Hospital centre.</i>	<i>Type of Rheumatism.</i>									<i>Total nos.</i>		
	<i>Acute rheum.</i>			<i>Chorea.</i>			<i>Rh. carditis.</i>			<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>
	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>	<i>Male.</i>	<i>Fem.</i>	<i>Total.</i>			
R.H.S.C.G.	1	1	2	1	—	1	—	—	—	191	171	362
S.T.H.	2	1	3	2	4	6	—	2	2	137	133	270

Table 5

Showing the incidence of rheumatism in the brothers and sisters of rheumatic patients :

A. Those who were medically examined at St. Thomas's Hospital.

B. - Those of whom histories were obtained from the mother.

<i>Type of disease.</i>	<i>No. of cases.</i>		
	<i>312 boys.</i>	<i>302 girls.</i>	<i>614 of both sexes.</i>
A.			
Acute rheumatism	13	7	20 or 3.3 per cent.
Chorea	9	17	26 „ 4.2 „
Cardiac disease	7	12	19 „ 3.1 „
Total	29 or 9.3%	36 or 11.9%	65 or 10.6 ± 1.2%
	<i>274 boys.</i>	<i>263 girls.</i>	<i>537 of both sexes.</i>
B.			
Acute rheumatism	15	18	33 or 6.1 per cent.
Chorea	7	14	21 „ 3.9 „
Cardiac disease	9	7	16 „ 3.0 „
Total	31 or 11.3%	39 or 14.8%	70 or 13.0 ± 1.5%

Those who were not examined were naturally the older members of the family who were away from home or detained at work. As there was no significant difference between the proportions of rheumatic siblings found by medical examination and by taking the history given by the mother, these two groups have been merged, as is seen in Table 3.

4. Parental Rheumatism

At the Children's Hospital, Great Ormond Street, both parents were examined by the Medical Officer where possible and only absolutely definite cases of rheumatism have been included. Little disparity was found between the histories given and the results of subsequent examination.

At the Royal Hospital for Sick Children, Glasgow, records regarding the presence or absence of rheumatic affection were obtainable in 195 mothers and 196 fathers. In the remaining cases, the children were either adopted or illegitimate and thus the history of one or another parent could not be ascertained.

At St. Thomas's Hospital, although the mothers were seen by Dr. Forest Smith and Dr. Hamilton, it was not found practicable to examine them all medically, but they were closely interrogated as to their rheumatic history. It was also not possible to examine the fathers; their histories were obtained from the mothers. In many cases information as to health in childhood (especially of the fathers) was scanty or unobtainable; in others, the grandmother or other relatives were consulted to verify dates, &c.

Tables 6 and 7 show the number of parents said to have suffered from rheumatism in the rheumatic and control series of families.

Table 6

Showing the number of cases of rheumatism in its different manifestation among the parents of rheumatic children at the Children's Hospital, Great Ormond Street, the Royal Hospital for Sick Children, Glasgow, and St. Thomas's Hospital.

<i>Hospital centre.</i>	<i>Type of Rheumatism.</i>											
	<i>Acute rheum.</i>			<i>Chorea.</i>			<i>Card. disease.</i>			<i>Total nos.</i>		
	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>
C.H.G.O.S. . . .	10	9	19	—	5	5	1	1	2	121	121	242
R.H.S.C.G. . . .	10	18	28	—	8	8	—	3	3	196	195	391
S.T.H.	35	36	71	—	18	18	2	4	6	400	400	800

Table 7

Showing the number of cases of rheumatism in its different manifestations in the parents of the control children at the Royal Hospital for Sick Children, Glasgow,

<i>Hospital centre.</i>	<i>Type of Rheumatism.</i>									<i>Total nos.</i>		
	<i>Acute rheum.</i>			<i>Chorea.</i>			<i>Carditis.</i>			<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>
	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>	<i>Father.</i>	<i>Mother.</i>	<i>Total.</i>			
R.H.S.C.G.	1	8	9	—	1	1	1	—	1	98	99	197
S.T.H.	6	7	13	1	3	4	—	1	1	100	100	200

The percentage of families with a history of parental rheumatism is shown below :

	<i>Rheumatic families.</i>		<i>Control families.</i>	
	<i>R.H.S.C.G.</i>	<i>S.T.H.</i>	<i>R.H.S.C.G.</i>	<i>S.T.H.</i>
No. of parents affected	39	95	11	18
No. of families in which they occurred	38	89	11	17
Percentage of total families with rheumatic history in parents	19.4±2.8	22.3±2.1	11.0±3.1	17.0±3.8

The percentage is higher in the rheumatic than in the control families in both centres, but the difference in the two types of family is not significant in the data from St. Thomas's Hospital may only be considered as possibly significant in the data from Glasgow.

In the rheumatic families investigated at the Children's Hospital, Great Ormond Street, the 26 cases occurred in 26 families, so that 21.5 per cent of the 121 families were recorded as having a rheumatic history in the parents, a figure which agrees closely with that found in the St. Thomas's Hospital data but is considerably lower than the 40 per cent. found by Ingerman and Wilson (1924).

5. The figures of the Three Hospitals as regards the Familial Incidence of Rheumatism Summarised and Compared

The foregoing account of the actual number of living persons liable to rheumatism in the families investigated and the percentage affected by the disease

have been given in detail in order to show the special circumstances in each hospital and also the main types of disease found, the number of each sex affected, &c.

For the purpose of gaining a clearer view of the results of the investigation as regards the familial incidence of rheumatism, Table 8 has been prepared. This table shows a comparison between the incidence of definite rheumatism, that is, acute rheumatism, chorea, and rheumatic carditis, among the parents and brothers and sisters (living and over 2 years of age) of rheumatic patients and control cases from the three hospitals.

Table 8.

Showing a comparison between the incidence of rheumatism (acute rheumatism, chorea, and rheumatic carditis) among the 'exposed' persons (the parents and living brothers and sisters over two years of age) in the families from which the Rheumatic and Control cases came.

<i>Hospital centre.</i>	<i>Males.</i>		<i>Females.</i>		<i>Both sexes.</i>	
	<i>Rheum. families.</i>	<i>Control families.</i>	<i>Rheum. families.</i>	<i>Control families.</i>	<i>Rheum. families.</i>	<i>Control families.</i>
C.H.G.O.S.						
No. affected .	22	—	25	—	47	—
Total no. .	262	—	298	—	560	—
Per cent. .	8.4±1.7	—	8.4±1.6	—	8.4±1.2	—
R.H.S.C.G.						
No. affected .	20	4	45	10	65	14
Total no. .	536	289	554	270	1,090	559
Per cent. .	3.7±0.8	1.4±0.7	8.1±1.2	3.7±1.1	6.0±0.7	2.5±0.7
S.T.H.						
No. affected .	97	11	133	18	230	29
Total no. .	986	237	965	233	1,951	470
Per cent. .	9.8±0.9	4.6±1.4	13.8±1.1	7.7±1.7	11.8±0.7	6.2±1.1

The proportions of rheumatic persons among the relations of rheumatic patients found at the three hospitals vary considerably. As seen in Table 8, these were 8.4, 6.0, and 11.8 per cent. respectively. The percentage in the Glasgow data, namely 6.0, is relatively low compared with that in the other centres, but it should be remarked that the results obtained by the two Glasgow observers showed some divergence, the

percentage among living relations found by Dr. Lowenfeld being 83, whereas Dr. Sutherland gives only 3-6. Dr. Lowenfeld's figure approximates very closely to that found at the Children's Hospital, Great Ormond Street, and also to the percentage of 8-8 affected by rheumatic disease found by Faulkner and White (1924) in 200 families containing 1,235 persons. None of the percentages cited is as high as that given by St. Lawrence (1922). He found 148 per cent. of rheumatic individuals in one hundred families comprising 480 'exposed persons'. The 'exposed persons' apparently included some who had died. This percentage does not greatly exceed that, namely, 118 per cent., found in the data from St. Thomas's Hospital. If in these data certain doubtful cases with histories in all probability of definite rheumatism, but which it was impossible to substantiate, had been included; and if it had been possible to examine more of the older individuals where doubtful histories of 'heart disease' were given, the St. Thomas's Hospital percentage might have been higher than 11.8 per cent. These figures may quite possibly be an under-estimate of the number of rheumatic persons in the 400 families.

In the case of the control families the percentages of rheumatism found by the two Glasgow observers differ less than in other cases, both being in the region of 2-0 per cent. The data for Glasgow show a consistently lower percentage of rheumatism, both in the rheumatic and control families, than is the case in the data for St. Thomas's Hospital. Whether this difference is due to variation in the general topographical distribution of rheumatism or not it is impossible to discover without some knowledge of the amount of rheumatism normally present in the districts from which patients are drawn by each hospital. Faulkner and White (1924) in 75 families of non-rheumatic patients composed of 474 'exposed persons' found 2.98 per cent. affected by rheumatism, that is, acute rheumatism, chorea, or rheumatic carditis. This figure again agrees very closely with the amount found in Glasgow but is considerably less than that found in London.

It will thus be seen that the number of persons among the relations of rheumatic children affected by rheumatism is found in Glasgow families to be rather more than twice, and in London families to be very nearly twice, as high as the number found among the relations of non-rheumatic children.

Some further details may be given. Among the families from which the rheumatic patients came the number of members of the same family affected by rheumatism, including the parents and the dead with a rheumatic history, are shown in Table 9, together with the figures given by St. Lawrence referring to 100 families.

Table 9

Showing the number of members of the same family affected by rheumatism in several series of families each containing a child under treatment for rheumatism (including the histories of parental rheumatism and of those amongst the dead who were said to have suffered from the 7 disease).

<i>No. of members of same family affected.</i>	<i>C.H.G.O.S.</i>	<i>R.H.S.C.G.</i>	<i>S.T.H.</i>	<i>St. Lawrence.</i>	<i>Faulkner and White.</i>
2 . .	33	47	100	33	—
3 . .	5	11	44	14	—
4 . .	3	—	11	2	—
5 . .	—	—	6	1	—
2 or more affected .	41	58	161	50	71
Per cent. of families .	33.9±4.3	29.0±3.2	40.3±2.5	50.0±5.0	35.5±3.4
No. of families . .	121	200	400	100	200

St. Lawrence finds 50 per cent. of families with two or more members affected. This is significantly higher than that shown in the data from all the sources cited except St. Thomas's Hospital.

Ingerman and Wilson (1924) found that 28 per cent. of their rheumatic cases had rheumatic siblings, and in the data for St. Thomas's Hospital 112 of the 400 rheumatic patients had one or more rheumatic siblings, that is also 28 per cent. Among the control families at St. Thomas's Hospital 17 had one member affected (in most cases a parent) and 5 or 5.0 per cent. had two or more cases of rheumatism in the same family. At the Royal Hospital for Sick Children, Glasgow, 12 control families had

1 case of rheumatism and 2 families had two members of the same family affected. Faulkner and White (1924) found that of 75 families belonging to non-rheumatic cases, 12 or 16 per cent. had more than one member affected by the disease.

Table 10 shows the incidence of definite rheumatism in the siblings of rheumatic and non-rheumatic patients from the three centres. The percentage of cases of rheumatism varies considerably in the different centres. The percentage for Glasgow as a whole is notably lower than in the other two centres, but there is some divergence between the figures of the two observers there. Dr. Lowenfeld's percentage of rheumatic brothers and sisters of rheumatic patients works out at 5.5, which approximates fairly closely to the figure from the Children's Hospital, Great Ormond Street, but Dr. Sutherland's percentage is only 1.9. Both these observers find a similar proportion, namely 0.8 per cent., among the siblings of the control children, but this estimate is considerably below the 41 per cent. found in the data from St. Thomas's Hospital.

Table 10

Showing a comparison between the incidence of, rheumatic disease in the living siblings of rheumatic and control patients.

<i>Hospital centre.</i>	<i>Males.</i>		<i>Females.</i>		<i>Both sexes.</i>	
	<i>Rheum.</i>	<i>Control.</i>	<i>Rheum.</i>	<i>Control.</i>	<i>Rheum.</i>	<i>Control.</i>
C.H.G.O.S.						
No. affected	11	—	10	—	21	—
Total no.	141	—	177	—	318	—
Per cent.	7.8±2.3	—	5.6±1.7	—	6.6±1.4	—
R.H.S.C.G.						
No. affected	10	2	16	1	26	3
Total no.	340	191	359	171	699	362
Per cent.	2.9±0.9	1.0±0.7	4.5±1.1	0.6±0.6	3.7±0.7	0.8±0.5
S.T.H.						
No. affected	60	4	75	7	135	11
Total no.	586	137	565	133	1,151	270
Per cent.	10.2±1.2	2.9±1.4	13.3±1.4	5.3±1.9	11.7±0.9	4.1±1.2

The difference in the incidence of rheumatism among the brothers and sisters of the rheumatic and control children respectively is striking, the percentage of those with rheumatism in the rheumatic families in the data from St. Thomas's Hospital being

almost three times greater than that of the control families, and in Glasgow more than four times greater. In Table 11 is shown a comparison between the incidence of parental rheumatism in the rheumatic and control families from each of the centres.