

Incidence of hay fever in a North London practice

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Summary

A practice in North west London consisting of about 6,000 patients, 30 per cent of whom are immigrant, yielded a sample of 77 patients who could be considered to be suffering from hay fever. These were questioned and skin tested.

The disease was found to be more prevalent in the immigrant West Indian section of the practice. These patients had not suffered from the disease before arrival in this country but had developed their symptoms after an interval of up to 14 years with an average of about five years. Most of the patients had arrived in this country as adults, and some differences in the pattern of disease from that encountered in the indigenous population were observed. The tendency is for the disease to begin between the age of five and 15 for the indigenous patient, although extreme cases with ages of onset of two and 74 years were found. However, in the immigrant West Indian group the age of onset tended to be between 25 and 45. In addition, the older an immigrant was on arrival in this country the longer hay fever took to develop. It was found that May was stated to be the month of onset of the disease for the indigenous group whereas June tended to be the month of onset for the immigrant group.

The sample proved too small to detect any existing patterns in personal or family history, but sex links were found in both response to grass pollen and a personal history of asthma, in that men showed less tendency to asthma whilst proportionately less women than men responded to grass pollen skin tests only.

We suggest that a diagnosis of hay fever should be considered in both the young and the elderly who present with recurrent symptoms occurring only in the summer months, of *one or more* of the following: sneezing, lacrimation, nasal drip, nasal blockage, wheezing, dry throat, or itchy eyes. The diagnosis can readily be confirmed by simple skin testing.

Introduction

Hay fever is an allergic disorder commonly defined as being characterised by bouts of sneezing, profuse watery nasal discharge and smarting and watering of the eyes. The symptoms had been described on numerous occasions over the centuries, but it was not until 1819 that the syndrome was clearly described by John Bostock at the Royal Medical and Chirurgical Society of London. His paper was entitled *Case of a Periodical Affection of the Eyes and Chest*. The aetiology however, remained a mystery until Charles Blackley of Manchester in 1873 instilled pollen grains into his own nose during the winter months thereby reproducing the symptoms which he had previously only experienced during the summer months. He deduced that it was the pollen that was the cause of his symptoms. The condition was named hay fever because it developed when walking in hay fields where there is a high pollen level.

The prevalence in the population of this common and temporarily disabling disease is quoted as varying from 0.5 per cent to three per cent in different surveys (Williams, 1958). Many sufferers will develop grass pollen asthma and Williams claims that five per cent of these pollen asthmatics develop asthma later (Williams *et al.*, 1958).

The allergic diseases had been known for centuries but it was not until 1906 that the word 'allergy' was introduced and defined by von Pirquet (1906) as "any acquired alteration in the capacity of the living tissues to react". There are many manifestations of such altered reactivity; apart from the well-defined common allergic conditions such as hay fever, asthma, dermatitis and perennial rhinitis, some other allergic reactions may produce *symptoms* superficially indistinguishable from those caused by non-allergic conditions. These include migraine, colitis, Ménière's syndrome and eczema (Vaughan and Black, 1954).

Methods

Every patient seen with one or more symptoms of hay fever was referred by his partners to D.C. who had already noted a high incidence of West Indians with reported hay fever in this multi-racial practice.

The 77 patients seen were asked to help complete a questionnaire based on the standard Bencard case history chart and the majority were also skin tested using the prick method against grass, shrub, trees and flower pollen. Details of the tests used and the questionnaire are given in the appendix.

TABLE 1
CLASSIFICATION OF THE PRACTICE BY AGE AND ETHNIC GROUP*

Age	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+	Totals
<i>Ethnic group</i>										
1	230	297	379	290	237	245	368	237	134	2417
2	11	19	143	175	76	41	31	9	2	507
2A	47	48	11	—	—	—	—	—	—	106
3	3	17	36	100	69	37	22	12	9	305
3A	38	76	13	2	2	1	1	—	—	133
4	11	104	192	390	247	99	23	6	—	1072
4A	291	275	8	2	—	—	—	—	—	576
5	2	9	8	40	10	2	—	—	1	72
5A	19	6	1	—	—	—	—	—	—	26
6	2	21	31	44	17	4	8	1	1	129
6A	9	7	1	—	—	—	1	—	—	18
7	—	4	8	19	6	—	1	—	—	38
7A	3	2	—	—	—	—	—	—	—	5
TOTALS	666	885	831	1062	664	429	455	265	147	5404

The ethnic group classification in the above and other tables is coded as follows:

- Group 1: British born with parents also born in Britain
- Group 2: Born in Eire
- Group 3: European born
- Group 4: Born in the West Indies
- Group 5: African born
- Group 6: Born in Asia
- Group 7: Other—(Australian etc.)

The letter A indicates that although born in Britain, the parents were from the corresponding group.

*These figures have been obtained from an unpublished survey of the age/sex register carried out in 1970. While the information on age is complete approximately ten per cent of the practice has no recorded ethnic group. For the purposes of this survey, this ten per cent have been allocated within their age group according to the recorded proportion of each ethnic group in that age group. The method of allocation used does not affect any conclusions drawn in this paper.

Results

Although there are only 77 hay fever patients recorded in the list we were fortunate in having the figures from an unpublished survey of our age-sex register carried out in 1970. This enabled us first to compare the characteristics of the 77 with those of the practice (table 1). The comparison proved useful and instructive even though the samples were to some extent self selected, as perhaps individuals from one nationality may present themselves more readily than individuals from another nationality.

We found no sex bias in the sample and the agreement is clear from table 2 and seems to indicate no preference for either sex by hay fever although individual symptoms were noted later to be sex-linked (table 10).

TABLE 2
SEX RATIOS IN SAMPLE COMPARED TO THAT IN THE PRACTICE

	<i>Male</i>	<i>Female</i>
Sample numbers (%)	35 (46)	42 (54)
Practice numbers (%)	2562 (47)	2841 (53)

Since the practice is in an immigrant area, considerable care has been taken over the classification by country of origin. This has made the comparison between ethnic groups in the sample and the practice particularly interesting. The results are shown in table 3.

TABLE 3
ETHNIC GROUP COMPOSITIONS OF PRACTICE AND SAMPLE
(PER CENT IN BRACKETS)

	<i>1</i>	<i>2</i>	<i>2A</i>	<i>3</i>	<i>3A</i>	<i>4</i>	<i>4A</i>	<i>Other</i>
Sample	25 (33)	3 (4)	0 (0)	1 (1)	0 (0)	45 (58)	3 (4)	0 (0)
Practice	2432 (45)	486 (9)	108 (2)	324 (6)	108 (2)	1081 (20)	594 (11)	270 (5)

Examination of table 3 indicates considerable differences in proportions immediately attributable to the predominance in the sample of adult West Indians. Removal of this group from the sample returns the proportions to those of the practice.

It thus becomes apparent that the prime source of 'at risk' patients in the practice is the group of newly arrived West Indian immigrants. This is emphasised by tables 4 and 5 in which the ages, and the ages of onset of the disease in the sample are compared with the ethnic groups and with the practice as a whole.

The age distribution is fairly uniform over the practice, while in the immigrant group there is a sharp increase in the 25-45 year old age group and this is echoed in the sample. This is emphasised in table 5 where the age of onset in the non-West Indian sector is seen to have a peak in the 5-15 age group whereas in the West Indian immigrant the peak occurs much later in the 25-45 age group.

Examining age, we find that the youngest patient seen was two and the eldest 74 but the most of the patients were in the 25-45 age group. Table 3 and figure 1 below show however that this is due to the preponderance of the West Indians in the sample. Table 5 shows that in that section of the sample born in Britain, age of onset tends to be

TABLE 4
CROSS-CLASSIFICATION OF AGE WITH ETHNIC GROUP
SAMPLE COMPARED WITH PRACTICE.

		Age	0-	5-	15-	25-	35-	45-	55-	65+
1	Sample		—	6	7	3	4	1	3	1
	Practice (per cent)		4.5	5.3	7.2	5.2	4.3	4.6	7.0	6.9
2	Sample		—	1	1	1	—	—	—	—
	Practice (per cent)		1.1	1.2	3.0	3.1	1.4	0.8	0.6	0.2
3	Sample		—	—	—	—	1	—	—	—
	Practice (per cent)		0.8	1.6	0.9	1.8	1.4	0.7	0.0	0.0
4	Sample		—	1	6	19	17	2	—	—
	Practice (per cent)		0.2	1.9	3.7	7.0	4.5	1.9	0.4	0.1
4A	Sample		—	3	—	—	—	—	—	—
	Practice (per cent)		5.7	4.9	0.2	0.0	0.0	0.0	0.0	0.0
Other	Sample		—	—	—	—	—	—	—	—
	Practice (per cent)		0.7	0.7	0.8	1.1	0.4	0.1	0.2	0.0

TABLE 5
CROSS-CLASSIFICATION OF AGE OF ONSET WITH ETHNIC GROUP

Age of onset	0-	5-	15-	25-	35-	45-	55-	65+
Ethnic group								
1	2	12	5	3	1	—	1	1
2	—	2	1	—	—	—	—	—
3	—	—	—	1	—	—	—	—
4	—	2	10	22	10	1	—	—
4A	1	2	—	—	—	—	—	—

within the 5-14 age range although in some cases it may be very early, and in one case recognisable at two and in others even as late as 74. Children of immigrant West Indian parents also come within this pattern as far as limitations of the sample tell us, whereas their parents seem in general to have been free from the symptoms before entering the country and then developed them at a later date.

In table 6 and figures 2 and 3 this gap is examined in greater detail. A few immigrants contract hay fever very soon or immediately after arrival but in some cases the delay may be as much as 10 to 14 years. The average delay is about five years.

TABLE 6
LAPSE IN YEARS AGAINST FREQUENCY

Lapse (years)	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Frequency	2	2	1	6	5	6	3	5	7	1	2	1	0	2	1	1

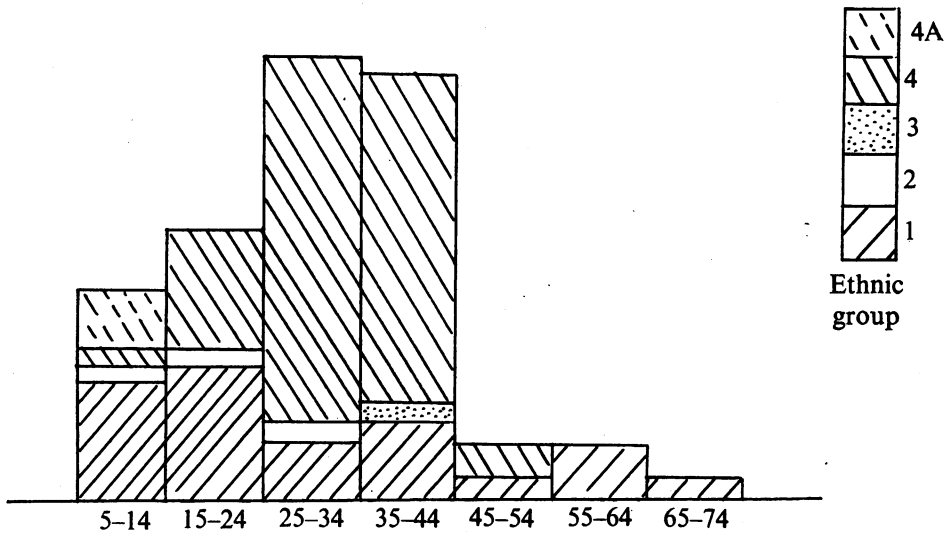


Figure 1 Histogram of age distribution sub-divided into ethnic sub-groups.

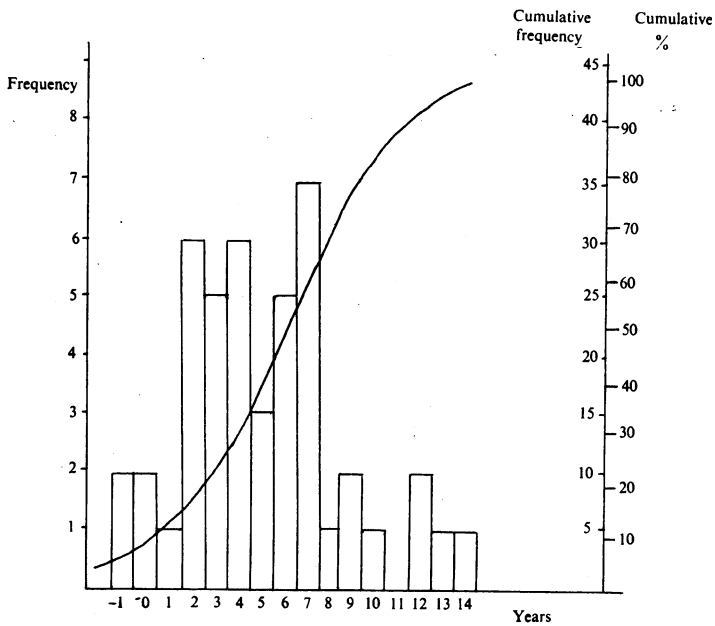


Figure 2 Histogram and cumulative frequency chart of delay in years between arrival and onset of hay fever in West Indian immigrants

There is evidence to indicate that of the susceptible arrival group, the older immigrant takes longer to develop the disease. Figure 3 shows the relationship between age on arrival and the time until symptoms develop. We found the sample correlation between age on arrival and the time taken for the disease to appear to be 0.3, a result significant at the five per cent level. Thus it seems that the older a susceptible patient is on arrival, the longer it takes him to be affected by the disease.

Figure 4 is a schematic representation of the scatter diagram of age of onset against present age.

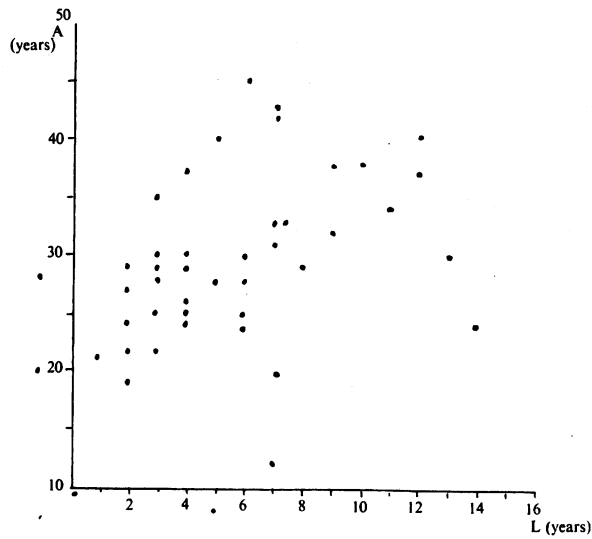


Figure 3 Scatter diagram of age on arrival (A) against lapse to onset (L) of hay fever in immigrant West Indians

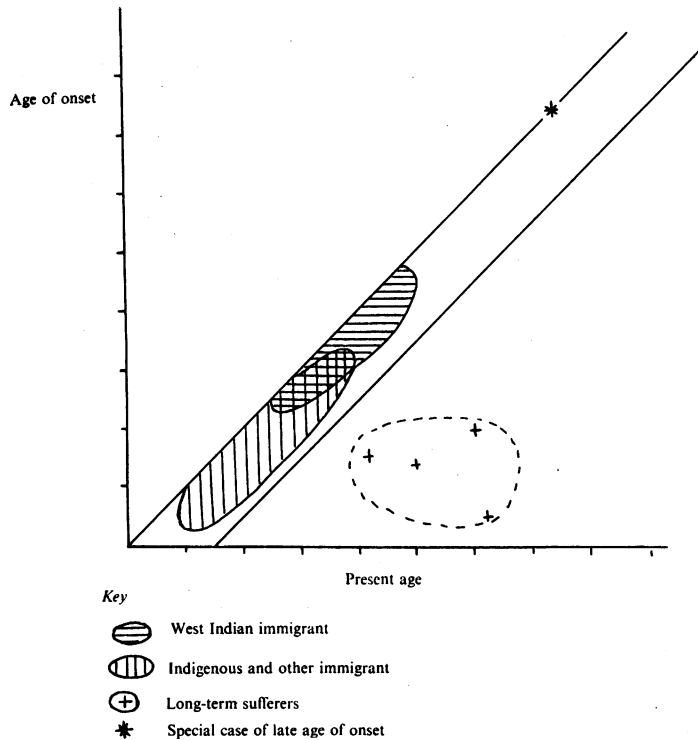


Figure 4 Schematic diagram of present age and age of onset

As one would expect, most cases lie in the 15 year-old band indicating that they had had the disease for less than 15 years. However there is a noticeable drift in the immigrant West Indian block indicating that both age of onset tends to be greater and the lapse from onset to present age is shorter. There are a few outliers on this diagram notably a small group of indigenous patients who have suffered for 30 years or more;

including one for 60 years, and also two who have developed symptoms of the condition late in life, one at the age of 60 and the other at 74 years.

The relationship of the month when symptoms are first noted with the ethnic group is shown in table 7.

TABLE 7
MONTH OF ATTACK CROSS-CLASSIFIED WITH ETHNIC GROUP

<i>Ethnic group</i>		1	2	3	4	4A	Total
<i>Month</i>	April	—	—	—	1	—	1
	May	15	1	1	7	1	25
	June	10	2	—	37	2	15

There is a distinct preference for June with the West Indians whereas, if anything, the indigenous population present their symptoms in May. A chi-squared test of significance shows significant association at the one per cent of significance level. A possible reason for this association is the need for a higher pollen count before the immigrant population is affected.

In table 8 the duration of attack in weeks is noted. This information is somewhat unreliable as is emphasised by the insistence on multiples of four weeks.

TABLE 8
DURATION OF ATTACK IN WEEKS BY ETHNIC GROUP

<i>Duration (weeks)</i>	0	1	2	3	4	5	6	7	8	9	10	11	12
<i>Ethnic group</i>													
1	—	—	—	1	10	1	1	—	5	1	1	—	5
2	—	—	—	—	2	—	1	—	—	—	—	—	—
3	—	—	—	—	—	—	—	—	—	—	—	—	1
4	—	—	—	2	9	—	2	1	15	—	1	—	15
4A	—	—	—	—	—	—	1	—	1	—	1	—	—

Although it was possible to examine the ages of patients with specific family histories, symptoms and skin tests, no particular patterns became clear. Analysis of individual skin testing results proved generally unrewarding as most skin tests, other than grass, proved negative. However, there was one important association in that although all the men responded to grass some of the women did not (table 9).

TABLE 9
ASSOCIATION OF ASTHMA AND SEX

	<i>Grass +ve</i>	<i>No reaction</i>
<i>Males</i>	35	0
<i>Females</i>	35	7

Of the others, trees proved the best represented with eight and 12 women responding and then shrubs, with six men and three women. However, in neither of these cases could there be said to be a significant sex association. There was however significant association in that eight of the nine affected by shrub pollen were immigrant West Indian.

Finally, the personal history, symptoms, skin test results and family history results were scanned for possible patterns. In 'personal history' it was interesting to note that the most common pattern was a completely negative record, that is to say there was no other personal allergic history of any kind. Forty-two people fell into this category. Seven patients had a record of asthma only and five of perennial rhinitis only. To have more than one other allergic diathesis was rare. One curious association which did emerge however is shown in table 10 where a linkage between sex and a personal history of asthma is shown.

TABLE 10
ASSOCIATION OF 'GRASS +VE' WITH SEX

	<i>Personal history of asthma</i>	<i>No personal history of asthma</i>
<i>Males</i>	3	32
<i>Females</i>	11	31

Personal symptoms proved more rewarding. Fifteen patients had all the symptoms offered from sneezing to itchy eyes. Since nasal drip and nasal block are considered important, these were examined in conjunction with the results being shown in table 11.

TABLE 11
LACK OF ASSOCIATION OR DISASSOCIATION BETWEEN NASAL DRIP AND NASAL BLOCK

	<i>Nasal drip</i>	<i>No nasal drip</i>
<i>Nasal block</i>	56	11
<i>No nasal block</i>	8	2

It is clear that no natural division takes place in these data between the 'drippers' and the 'blockers'. One patient possessed a very sparse pattern with only nasal block and headache being recorded. When however a skin test was carried out he proved to be grass positive indicating the need to classify even the relatively minor symptoms. It should, however, be re-emphasised that most patients had three or more symptoms.

The pattern in family history reflected somewhat the trend in personal history. Thirty-six had no family history of any related condition, 11 had a history of hay fever only, 16 had a history of asthma often associated with something else, in four cases with hay fever, two with rhinitis. Ten had a family history of eczema sometimes associated with other diseases. No one had a history in the family suggestive of Ménière's disease and only one had a history of colitis.

Discussion

As we have already noted in many ways it is clear that we are dealing with a mixed population with distinct profiles of disease. It was therefore with interest that we compared our results with those of Fry (1963). We draw comparisons in these three broad areas.

(1) Prevalence rate

We found a mean annual prevalence rate of 12 per thousand; somewhat lower than Fry's figures. In figure 5 we show Fry's data for annual prevalence per 1,000 compared with the present survey.

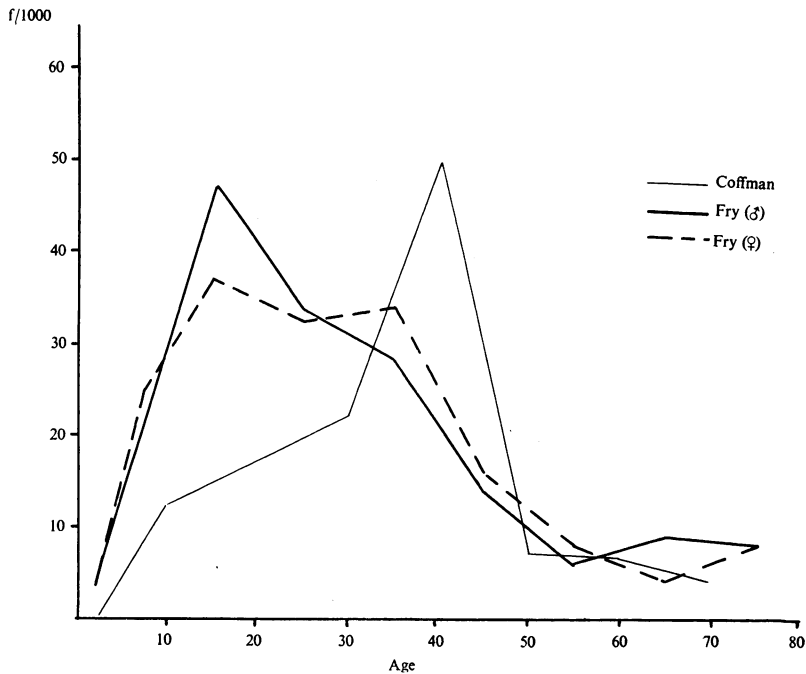


Figure 5 Annual prevalence per 1,000

At this stage it is not possible for us to draw an immediate ethnic comparison owing to some inherent difficulties in the earlier survey of the age-sex register but it is immediately clear that the new annual prevalence rate per thousand rises to a peak much later than in Fry's data showing the influence of the immigrant component. A broad analysis of the indigenous component pattern gives general agreement with Fry's data. We do, however, believe that there is an important minority who develop hay fever after the age of 50.

(2) Age of onset

Here we found it more helpful to reconstruct Fry's original data in the form of an ascending Ogive or cumulative relative frequency curve. At this stage our data were sufficiently clear to enable us to draw two separate curves corresponding to the two component populations. These and Fry's two original sets of data are shown on figure 6. The differences are now striking. Our indigenous population curve follows an almost identical path to that of Fry's two populations but the immigrant component rises rapidly between the age of 25 and 45 with an equally dramatic fall off between 45 and 50. In the indigenous we also found that about eight per cent of new cases came at an age greater than 50.

(3) Associated conditions

We found 21 per cent with familial asthma and 25 per cent with familial hay fever. This agrees with Fry's combined figures of 30 per cent. However, we found only 18 per cent with a personal history of asthma and 12 per cent with eczema, figures depressed compared with Fry's due to the immigrant component. Urticaria however, is found in about the same frequency. Fry made no mention of allergic rhinitis which we found in 16 per cent of patients.

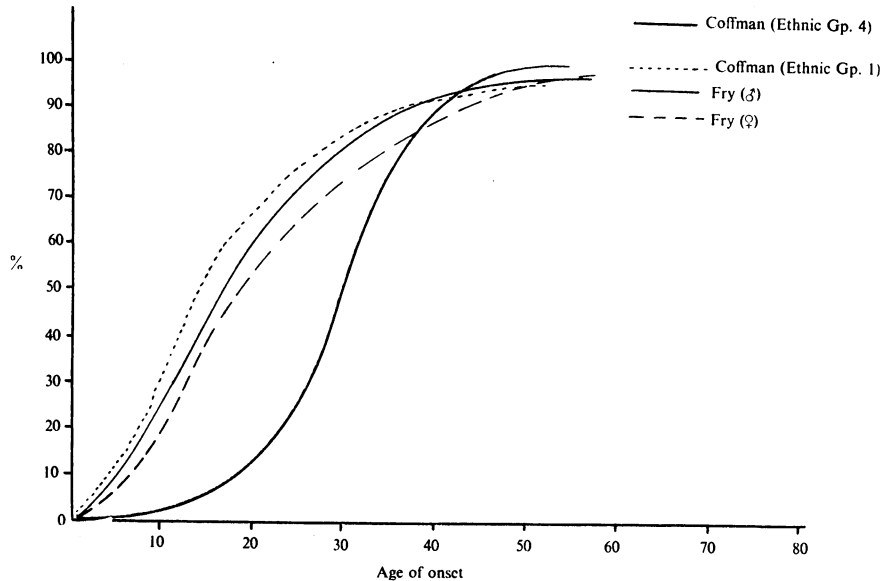


Figure 6 Cumulative per cent age of onset

Acknowledgements

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Appendix

(1) Allergens used

- B₁** *Shrubs* Golden Rod, Hawthorn, Heather, Lupin, Michaelmas Daisy, Nettle, Plantain, Privet, Rose.
B₂ *Grasses*, Bent, Brome, Cocksfoot, Dogstail, False Oat, Fescue, Foxtail, Meadow, Rye, Timothy, Vernal, Yorkshire Fos.
B₃ *Trees*, Alder, Ash, Beech, Birch, Elm, Fir, Hazel, Lime, Oak, Plane, Sycamore, Willow.
B₄ *Early summer flowers*, Buttercup, Marguerite, Nettle, Plantain, Privet, Rose, White Goosefoot (Lamb's Quarter).

(2) Questionnaire

A copy of the questionnaire can be obtained from Dr D. Coffman, 9 Wrotesley Road, London, NW10.