

ciation of leukaemia with other forms of malignant disease is briefly discussed. She has remained free of symptoms and signs of her leukaemia for eight and a half years. In spite of a normal peripheral blood count, marrow aspiration reveals findings consistent with chronic lymphatic leukaemia. This lack of correlation as well as certain features affecting the prognosis in this disease is discussed.

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CURRENT SMOKING HABITS IN 1957 BASED ON MASS RADIOGRAPHY SURVEYS IN THE MIDLANDS

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In conjunction with our colleagues of the mass radiography service in the Birmingham region, we are engaged in carrying out an investigation of certain aspects of cases of bronchial carcinoma discovered by mass radiography. Naturally we must examine the smoking habits of the patients concerned in relation to those of a control group. In considering this aspect of the inquiry we encountered the absence of reliable data relating to the smoking habits of the population in this region. The only exceptions are the data given by Lowe (1956) for tuberculous patients and for a control group chosen from in-patients and out-patients of "acute" hospitals in Birmingham. The "catchment area" of these hospitals and clinics is, however, considerably smaller than the area being examined by our units, and we therefore decided to use some of our routine mass radiography surveys to obtain data about current and past smoking habits of the population in the Midlands. In this way we hoped to obtain standards against which to compare our findings in the investigation of bronchial carcinoma.

The main purpose of this paper is a comparison of our groups *inter se*, and for this an analysis of "current smoking habits" in contradistinction to "total smoking habits" seemed to be sufficient. An analysis of "total smoking habits" has been reserved for a future study,

in which we shall attempt to compare our findings with the data by other authors, who mostly use this definition.

We consider it important to stress that the investigation took place during the first five months of 1957, and that the collection of data was completed before the issue of the Medical Research Council's report (1957) and before the subsequent statement about smoking risks by the Parliamentary Secretary to the Minister of Health on June 27, 1957. Furthermore, during the period of collecting data there was no marked change in the price of cigarettes or tobacco. We hope to re-investigate the same groups in the future, with a view to possible changes in smoking habits brought about by the changing economic or psychological climate of the country.

Definition of Smoking Habits.—In this paper a "current smoker" is defined as a person *who at the time of the interview smoked as much as one cigarette a day or ½ oz. (14 g.) of pipe tobacco a week.* Mixed smokers have been classified according to prevalent habit. The very small number of cigar smokers has been disregarded.

Methods of Investigation

It was decided to carry out the investigation during mass radiography surveys held in two industrial areas (Birmingham and Stoke-on-Trent), in a small town in Herefordshire (Leominster), in Shropshire, and in the urban district of Stourbridge (Worcestershire). These areas are typical of the places where mass radiography surveys are held in the Midlands. The surveys were not planned primarily with a view to obtaining a record of smoking habits, but were part of the normal mass radiography programme of each unit in accordance with the policy and procedure in this region. In fact, it was decided to record this information only shortly before the surveys began.

The groups examined were: (1) 7,680 employees of a large electrical engineering company in Birmingham; (2) 2,774 underground and surface workers in three North Staffordshire coal-mines; (3) 2,452 workers in ten pottery factories in Stoke-on-Trent, manufacturing general earthenware, glazed tiles, and sanitary earthenware; (4) 6,571 persons attending open public sessions in Herefordshire, in Stourbridge (Worcestershire), and in Shropshire. This last group included housewives, office workers, shop people, young persons, and other volunteers from the general public. The large majority of these persons were not employed in industry.

The proportion of employees examined was about usual for mass radiography industrial surveys in this region: 70% of the employees of the Birmingham factory responded, 69% of the pottery workers, and 73% of the colliery workers in the Stoke area. In the Herefordshire survey 63% of the available population attended (Posner, 1958).

The clerks of the units carrying out the surveys were thoroughly briefed to ask a standard set of questions relating to current and past smoking habits, and to enter the answer by simple coding on the registration cards. The volunteers co-operated fully in giving the requisite facts, and the number of persons who refused to give information or whose data were so vague as to be useless was extremely small: in the industrial surveys, for instance, only 48 out of 12,906 (0.4%).

Results

The well-known fact that proportionately more men smoke than do women is supported by the figures given in Table I. Proportions for men were roughly twice the corresponding values for women. The maximum proportion of smokers among men was that for miners at Stoke, and the result for the pottery workers at Stoke was only slightly less than this maximum. Almost 70% of men in the Shropshire and

TABLE I.—Proportions of Smokers of all Persons Interviewed

Survey	Men			Women		
	Total Interviewed	No. of Smokers at Present	Percentage of Smokers	Total Interviewed	No. of Smokers at Present	Percentage of Smokers
Birmingham factory ..	5,821	3,840	66.0	1,859	700	37.7
Stoke miners ..	2,774	2,106	75.9			
" potters ..	929	686	73.8	1,523	568	37.3
Shropshire ..	343	237	69.1	386	106	27.5
Herefordshire ..	1,760	1,039	59.0	2,222	626	28.2
Stourbridge ..	715	497	69.5	1,145	322	28.1

Stourbridge surveys were classed as smokers, as were two-thirds of the employees in the Birmingham factory. In contrast, the result for men in the Herefordshire group was outstandingly low, and it is interesting that this proportion was significantly less than that for Shropshire, which is also a rural area.

Table I also shows the almost identical proportion of smokers in women employed in the Birmingham factory and in female pottery workers, and the very close agreement between proportions of smokers in women who attended public surveys in Herefordshire, Stourbridge, and Shropshire, the majority of whom were not gainfully employed in industry or commerce.

In Table II, distinction is made between male cigarette and pipe smokers. The comments made above in respect

TABLE II.—Smoking Habits at Time of Survey by Age and Sex

Age Group (Years)	Men				Women	
	Total Interviewed	Percentage of Cigarette Smokers	Percentage of Pipe Smokers	Percentage of Smokers All Types	Total Interviewed	Percentage of Cigarette Smokers
<i>Birmingham Factory</i>						
15-24 ..	1,327	47.8	2.3	50.1	767	31.0
25-34 ..	1,458	61.9	4.5	66.4	375	47.7
35-44 ..	1,334	65.4	8.0	73.4	363	43.3
45-54 ..	998	62.8	9.6	72.4	241	37.3
55 and over	704	56.4	15.1	71.5	113	31.8
All ages ..	5,821	59.0	7.0	66.0	1,859	37.7
<i>Stoke Miners</i>						
15-24 ..	423	65.9	1.2	67.1		
25-34 ..	648	77.3	2.5	79.8		
35-44 ..	646	72.9	7.1	80.0		
45-54 ..	668	69.0	8.2	77.2		
55 and over	389	50.9	19.0	69.9		
All ages ..	2,774	68.9	7.0	75.9		
<i>Stoke Potters</i>						
15-24 ..	165	53.3	1.2	54.5	499	27.7
25-34 ..	238	73.9	1.7	75.6	290	52.1
35-44 ..	236	73.3	5.1	78.4	336	49.7
45-54 ..	202	74.8	5.4	80.2	293	30.0
55 and over	88	59.1	19.3	78.4	105	22.9
All ages ..	929	68.9	4.9	73.8	1,523	37.3
<i>Shropshire</i>						
15-24 ..	45	37.8	2.2	40.0	84	19.0
25-34 ..	70	61.4	7.1	68.5	84	34.5
35-44 ..	101	75.2	4.0	79.2	93	43.0
45-54 ..	67	73.1	6.0	79.1	71	19.7
55 and over	60	50.0	13.3	63.3	54	13.0
All ages ..	343	62.7	6.4	69.1	386	27.5
<i>Herefordshire</i>						
15-24 ..	297	33.3	1.7	35.0	529	16.6
25-34 ..	401	54.9	5.5	60.4	440	40.9
35-44 ..	385	61.8	7.5	69.3	417	37.7
45-54 ..	324	51.6	14.2	65.8	390	36.2
55 and over	353	42.2	18.4	60.6	446	13.5
All ages ..	1,760	49.4	9.6	59.0	2,222	28.2
<i>Stourbridge</i>						
15-24 ..	98	46.9	2.0	48.9	250	22.0
25-34 ..	192	58.3	8.9	67.2	277	35.0
35-44 ..	198	67.7	8.1	75.8	304	37.8
45-54 ..	122	73.0	9.0	82.0	186	19.9
55 and over	105	50.5	16.2	66.7	128	14.1
All ages ..	715	60.7	8.8	69.5	1,145	28.1

of all male smokers regardless of method are appropriate to the proportion of cigarette smokers. The values for miners and potters were almost identical, and the differences in the other male groups were only small. The exception was Herefordshire, where only half of the men smoked cigarettes, but a greater proportion (10%) of men smoked pipes than in any other of our groups. The lowest proportion of pipe smokers was found in the potters of Stoke-on-Trent (5%).

As very little general information is available about the variations of current smoking habits according to age, we attach importance to the habits according to decennial age groups, also shown in Table II. Ages above 55 have been combined, as the number of persons over 60 years old was relatively small. The proportion of male smokers of all types for a given age group differed from one survey group to another. However, certain patterns emerge from Table II which are common to most, if not all, of the groups.

In the first place, a smaller proportion of men in the 15-24 age group were smokers than in any other age group, and the maximum proportions occurred for the two age groups 35-44 and 45-54 years. In all surveys except that of men in Stourbridge, differences between the values for these two age groups were very small. In each survey, smaller proportions of men aged 55 years and over were current smokers than in preceding age groups. Broadly speaking, values in this age group agreed closely with those for the age group 25-34 years.

A similar pattern of variation with respect to age was found when only male cigarette smokers were considered, although a much greater excess of cigarette smokers was found in younger men than in those aged 55 years and over. On the other hand, the proportion of men who smoked pipes increased with age; in each survey the proportion for men aged 55 years and over (45 years and over in the Herefordshire survey) was about twice that for the preceding age group.

The pattern of current smoking habits among women with respect to age differed considerably from that for men. Again several inter-survey differences are evident from Table II. In all age groups the proportions of smokers among female employees of the Birmingham factory and among female potters were higher than in the three other surveys. An exception was found in women aged 35-44 years in Shropshire, where only a relatively small number of women were interviewed, and the 45-54 years group in Herefordshire. Broadly speaking, greater proportions of women between 25-34 and 35-44 years smoked than did those at the lower and upper end of the age scale.

Smokers have been further analysed with respect to the number of cigarettes smoked a day, converting the amounts of pipe tobacco consumed per week into cigarettes a day according to the usual formula: 1 oz. (28 g.) of tobacco a week equals 4 cigarettes a day. Table III gives percentage distributions for each age group and each survey group. Examination of the distributions for *men of all ages* shows that the proportion smoking fewer than 5 cigarettes a day varied between 7.8 and 11.3%; there was a close correspondence between figures for the Shropshire and Herefordshire surveys. In three of the surveys slightly more than 40% of the men smoked 5-14 cigarettes a day, and there was close correspondence between two of the remainder; the proportion for the miners in Stoke was relatively high. There was therefore a large measure of agreement between the distributions for the surveys, although that for Stoke miners is atypical. Whereas the proportion of smokers was greater among miners than among men in any other survey group, the miners *consumed* less than smokers in the other groups. This finding reflects the fact that miners cannot smoke underground.

In each survey group the large proportion of *women* who smoked cigarettes consumed between 5 and 14 cigarettes a day. In two of the groups almost 30% smoked fewer than

TABLE III.—Distribution of Smokers According to Age, Sex, and Number of Cigarettes (or equivalent pipe tobacco) Smoked a Day

Age Group (Years)	Daily Consumption										
	Men					Women					
	< 5	5-14	15-24	25 and Over	Totals	< 5	5-14	15-24	25 and Over	Totals	
Birmingham factory	15-24 ..	14.1	55.9	27.2	2.8	100.0 (666)	26.1	62.2	10.9	0.8	100.0 (238)
	25-34 ..	5.9	39.0	44.1	11.0	100.0 (969)	12.8	63.7	22.9	0.6	100.0 (179)
	35-44 ..	7.6	33.0	45.0	14.4	100.0 (979)	12.1	63.0	21.7	3.2	100.0 (157)
	45-54 ..	5.7	38.5	42.5	13.4	100.0 (723)	25.6	53.3	17.8	3.3	100.0 (90)
	55 and over	10.9	43.9	36.8	8.4	100.0 (503)	33.3	61.1	5.6	—	100.0 (36)
	All ages ..	8.4	40.9	40.1	10.6	100.0 (3,840)	19.9	61.6	17.0	1.5	100.0 (700)
Stoke Miners	15-24 ..	22.5	53.2	21.5	2.8	100.0 (284)					
	25-34 ..	7.5	45.5	39.9	7.2	100.0 (517)					
	35-44 ..	10.1	45.8	36.6	7.5	100.0 (517)					
	45-54 ..	9.3	47.9	35.9	7.0	100.0 (516)					
	55 and over	12.9	57.4	26.1	3.7	100.0 (272)					
	All ages ..	11.3	48.7	33.8	6.2	100.0 (2,106)					
Stoke Potters	15-24 ..	20.0	45.6	28.9	5.6	100.0 (90)	60.9	34.1	4.3	0.7	100.0 (138)
	25-34 ..	6.1	36.7	45.0	12.2	100.0 (180)	29.8	57.0	12.6	0.7	100.0 (151)
	35-44 ..	6.0	27.6	50.8	15.7	100.0 (185)	28.7	55.1	15.0	1.2	100.0 (167)
	45-54 ..	8.0	32.1	40.1	19.8	100.0 (162)	48.9	40.9	9.1	1.1	100.0 (88)
	55 and over	11.6	36.2	31.9	20.3	100.0 (69)	45.8	33.3	16.7	4.2	100.0 (24)
	All Ages ..	8.9	34.3	42.0	14.9	100.0 (686)	40.7	47.4	10.9	1.1	100.0 (568)
Shropshire	15-24 ..	11.1	33.3	55.6	—	100.0 (18)	31.3	43.8	18.8	6.3	100.0 (16)
	25-34 ..	8.3	33.3	47.9	10.4	100.0 (48)	31.0	55.2	10.3	3.3	100.0 (29)
	35-44 ..	7.5	28.8	51.3	12.5	100.0 (80)	22.5	55.0	22.5	—	100.0 (40)
	45-54 ..	3.8	37.7	41.5	17.0	100.0 (53)	14.3	64.3	14.3	7.1	100.0 (14)
	55 and over	13.2	34.2	39.5	13.2	100.0 (38)	42.9	28.6	—	28.6	100.0 (7)
	All ages ..	8.0	32.9	46.8	12.2	100.0 (237)	26.4	52.8	16.0	4.7	100.0 (106)
Hereford- shire	15-24 ..	8.7	47.6	37.9	5.8	100.0 (103)	30.7	56.8	10.2	2.3	100.0 (88)
	25-34 ..	7.9	44.0	39.8	8.3	100.0 (241)	19.4	61.7	16.7	2.2	100.0 (180)
	35-44 ..	4.1	39.6	43.7	12.7	100.0 (268)	13.4	59.9	24.2	2.5	100.0 (157)
	45-54 ..	8.0	39.0	36.2	16.9	100.0 (213)	17.0	57.4	22.0	3.6	100.0 (141)
	55 and over	11.7	50.9	29.0	8.4	100.0 (214)	18.3	51.7	25.0	5.0	100.0 (60)
	All ages ..	7.8	43.6	37.6	11.0	100.0 (1,039)	18.8	58.7	19.6	2.9	100.0 (626)
Stourbridge	15-24 ..	20.8	29.2	41.7	8.3	100.0 (48)	34.5	58.2	7.3	—	100.0 (55)
	25-34 ..	9.3	48.8	33.3	8.5	100.0 (129)	23.7	62.9	12.4	1.0	100.0 (97)
	35-44 ..	9.3	36.0	41.3	13.3	100.0 (150)	33.9	52.2	13.9	—	100.0 (115)
	45-54 ..	5.0	41.0	36.0	18.0	100.0 (100)	16.2	59.5	24.3	—	100.0 (37)
	55 and over	11.4	48.6	34.3	5.7	100.0 (70)	38.9	50.0	11.1	—	100.0 (18)
	All ages ..	9.9	41.5	37.2	11.5	100.0 (497)	29.2	57.2	13.3	0.3	100.0 (322)

5, and in another two groups almost one-fifth of the women smokers consumed only this amount. The exceptionally high proportion of women potters who smoked fewer than 5 a day may reflect the fact that smoking is restricted during certain phases of their work. Very few women smoked 25 cigarettes or more a day.

With regard to the age-specific variations in the amount of tobacco consumed, we found it difficult to specify an overall picture, as there are some marked inter-survey differences. Each survey is therefore summarized in turn. No comments are given for the Shropshire survey, as the numbers of smokers in individual age groups were rather small.

Inter-survey Differences

Birmingham Factory.—Few men between 15 and 24 years of age smoked 25 or more cigarettes a day, and a greater proportion of these young men smoked fewer than 15 cigarettes a day than did those in older age groups. The percentage distribution for the three age groups between 25 and 54 years was very similar. In the oldest age groups fewer men smoked more than 25 cigarettes than those in the preceding three groups. A quarter of the women smokers aged 15-24 years smoked fewer than 5 cigarettes a day. Women in the two groups between 25 and 44 years tended to smoke more than those in other age groups. The number of women in the oldest age group was small, but it is clear that such women smoked fewer cigarettes a day than did the younger women.

Potters.—The proportion of heavy smokers (more than 25 cigarettes a day) in men increased with age, and one-fifth of those aged 45 years and over smoked this amount. In the youngest age group almost two-thirds of the men consumed fewer than 15 cigarettes a day, and the correspond-

ing proportion for the oldest age group was the second largest in this series. Between the ages 35 and 44 two-thirds of the smokers consumed 15 cigarettes or more a day. An outstandingly large proportion of women aged 15-24 years smoked fewer than 5 cigarettes and 95% in this group fewer than 15 a day. Similarly, as in the Birmingham factory, a close correspondence existed between the 25-34 and 35-44 age groups. Almost half of the women smokers aged 45 years or over smoked fewer than 5 cigarettes a day as compared with about 30% for those aged between 25 and 34 years.

Miners.—Consumption varied little with age between 25 and 54 years. Three-quarters of the youngest group smoked fewer than 15 cigarettes a day. The proportions of heavy smokers were small in both the youngest and oldest groups.

Herefordshire.—The proportion of heavy smokers in men increased from a minimum in the youngest to a maximum in the 45-54 years age group. Again a relatively large proportion of men over 55 years smoked fewer than 15 cigarettes a day. In this survey marked differences between consumption for the two youngest groups were not evident. Almost one-third of women in the youngest age group who smoked consumed fewer than 5 cigarettes a day. As elsewhere, the youngest women consumed fewer cigarettes than did female smokers of other ages. Distributions for the other age groups did not differ unduly from each other, although the proportion of smokers between 25 and 34 years who consumed 15 cigarettes a day or more was relatively low.

Stourbridge.—In the youngest age group exactly half of the male smokers consumed fewer than 15 cigarettes a day, and the value for these "light smokers" was highest in the oldest age group. With regard to heavy smokers, in

men the pattern was similar to that in the Herefordshire survey, with a sizable difference between the two oldest age groups. In this survey the total number of women smokers in each age group was somewhat small, and it is difficult to determine any definite age specific pattern.

Discussion

By collecting data at mass radiography surveys we arrived at our results in a very different way from most other authors who have studied smoking habits in this country in recent years. Some of these used, as controls of patients suffering or dead from carcinoma of the lung and chronic bronchitis, matched groups of residents in the same area, who for reasons of expediency and economy were chosen from in-patients and out-patients of general and specialized hospitals (Doll and Hill, 1950, 1952; McConnell *et al.*, 1952; Oswald *et al.*, 1953; Stocks and Campbell, 1955). One of these investigations (Lowe, 1956), is of particular interest to us, as that author's control group of in-patients and out-patients was drawn from the Birmingham area. Stocks and Campbell (1955) pointed out that "it is not known, and cannot be ascertained, to what extent, if at all, patients at general hospitals differ in respect of their past smoking habits from the whole population of the same age in the same area." Lowe's definition of smoking habits is different from that used by us in this paper, which deals only with current smokers, but there are certain indications that the smoking habits of his hospital patients may differ from those of industrial workers in Birmingham.

Well-known examples of investigations into the smoking habits of persons who at the time of questioning were neither confined to hospital nor attending out-patient clinics are the studies of doctors (Doll and Hill, 1954, 1956) and of civil servants in London (Oswald and Medvei, 1955). Both these occupations fell into an entirely different social group from the homogeneous groups in our surveys—the miners, potters, and electrical engineers. The Hulton Readership Survey (1956), based on 4,000 interviews of persons of 16 years of age and over, gives the proportion of those "who ever smoke a cigarette" as 65% for men and 42% for women, with an additional 17% of men "who ever smoke a pipe." This survey, like that of the doctors, was a nationwide investigation, and there may be sizable geographical differences hidden in national figures.

Our data may be compared with those given by Higgins (1957) in respect of a sample of the population in the Vale of Glamorgan, and with those given by Ogilvie and Newell (1957) for a control group of persons resident in Newcastle upon Tyne. Higgins found that 74% of men between the ages of 25 and 74 years were *current* smokers, as were 52% of women aged 25–44 years and 24% of women aged 45–74 years. By combining the results for our three public surveys and applying them to the age structure of Higgins's sample, we obtained the following corresponding proportions: men, 68%; women aged 25–44 years, 38%; women aged 45–74 years, 17%. Ogilvie and Newell found that 74% of men in their control series were current smokers, as were 28% of the women. Corresponding proportions for men and women in our three public surveys combined, after standardization with respect to age, were respectively 70% and 28%.

Conclusions

Differences between our findings and those of other writers may be due to the complex causes of response to mass radiography surveys. However, it seems highly unlikely that smoking habits contribute materially to the response and "lapse" rates at such surveys, and in these surveys the public had not been informed beforehand that questions about smoking would be asked.

In this investigation we attach importance to the following aspects:

(a) A smaller proportion of *men* aged between 15 and 24 years were smokers than in any other age group.

There was relatively little change in smoking habits with age within the range 25–54 years, but the proportion of smokers among men aged 55 years and over was less than that for the preceding age group.

(b) The pattern of current smoking habits among women with respect to age was quite different from that for men. Proportions of smokers among women between 25 and 34 years and between 35 and 44 years of age were similar and greatly exceeded those referable to women in other age groups.

(c) The proportions of smokers among examinees in the industrial surveys were greater than those for persons examined at the public surveys, and such differences were especially noticeable for women.

(d) In addition to these differences between results obtained from the industrial and public surveys, there were variations within each of these two types of survey, and especially with regard to the amount of tobacco consumed. In particular, the findings for the men in the Herefordshire survey differed from those of the other two public surveys, and it would be of interest to compare the smoking habits of men in the same age and occupational groups in geographically neighbouring areas. For example, the smoking habits of North Staffordshire miners may differ from those of colliers in Lancashire (Higgins *et al.*, 1956), and this aspect will also be investigated.

We thank the staff of the three mass radiography units for their enthusiastic and painstaking work in recording information in addition to that normally obtained at M.M.R. examinations. Our thanks are also due to the Birmingham Regional Hospital Board for employing a temporary clerk to assist with the processing of the recorded data.

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At a joint meeting of the Liverpool Medical Institution and the Manchester Medical Society on March 6, Dr. RALSTON PATERSON, director of the Holt Radium Institute, read a paper on "Breast Cancer: A Preliminary Report of Two Clinical Experiments." The value of simple x-ray castration was being studied on a series of 750 patients, and the five-year results for the first 300 were reported as a provisional finding. The overall figures showed a real advantage accruing from the use of x-ray castration in breast cancer. This had been more marked the earlier in the course of the disease that the radiation therapy was given. The second study, of the value of prophylactic post-operative irradiation, involved some 1,400 patients in all, and the results from 700 of these after five years were reported. These patients had been divided into four groups—i.e., those receiving and those not receiving quadrat radiation (primarily flap and axilla radiated), and those receiving and not receiving peripheral radiation (primarily supraclavicular and parasternal radiation). The results were effectively identical whether the patients were treated by irradiation prophylactically or merely carefully followed up and only irradiated if necessary. The second paper was by Mr. IAN ORR on "Surgical Surprises in the Small Intestine," in which he reviewed a number of lesions of the small intestine which might prove difficult to diagnose.