THE EPIDEMIOLOGY OF INFLAMMATORY BOWEL DISEASE

COLONEL D M ROBERTS, MD, FRCP(Ed), MRCP(Lond)

Royal Army Medical College, London

The epidemiological study of inflammatory bowel disease (IBD) is made difficult by problems of case ascertainment although, in developed countries, hospital admission rates are probably acceptable as evidence (Evans and Acheson¹). Many epidemiological surveys of ulcerative colitis (UC) were done before Crohn's colitis and ischaemic colitis were recognised as separate entities and are therefore of dubious quality. This article therefore concentrates on the more recently published work in which acceptable criteria for ascertainment and diagnosis have been used. Because of possible confusion due to special forms of acute ileitis such as those due to *Yersinia enterocolitica* (Winblad *et al*²) and the fish nematode larva *Anisakis* (Ishikura and Hayasaka³) surveys which include the syndrome of acute regional enteritis have been excluded.

Geographical variations in incidence

Ulcerative colitis

Table I shows the incidence of UC in various parts of the world, grouped into broad geographical areas. Ulcerative colitis appears to be most common in Northern Europe but much less so in Southern Europe, with Eastern Europe occupying an intermediate position. On the American Continent, too, the incidence is higher in the north than in the south. Little is known of the incidence in Africa and Asia.

Table I
Ulcerative colitis — incidence / 100,000 / year

Area	Year/s	Incidence
NORTHERN EUROPE	Copenhagen 1961-66	7.3
	Oxford 1951-60	6.5
	Malmö 1958-70	6.4
	Finland 1967	4.8
	Norway 1964-69	3.3
	Hamburg 1965	2.6
EASTERN EUROPE	Rumania 1965	2.8
	Yugoslavia (Slovenia) 1963	1.5
	Yugoslavia (Celje) 1965	1.4
SOUTHERN EUROPE	Seville 1966	0.4
	Vienna 1965	0.3
	Iran 1965	0.2
OTHERS	Tel Aviv 1961-70	3.66
	Baltimore 1965	3.5
	New Zealand 1950-66	2.86
	Japan 1965	2.1
	Chile 1965	0.2
	Mexico 1965	0.2

Crohn's disease

Table II shows the incidence of CD in various parts of the world. No gross geographical variations seem to occur, although the high figure reported from Malmö is interesting.

Table II
Crohn's disease — incidence / 100,000 / year

Area		Year/s	Incidence
UNITED KINGDOM	Clydesdale	1961-70	1.55
	Gloucester	1966-70	1.5
	London	1961	1.0
	Nottingham	1958-61 & 1968-72	1.93
	Oxford	1951-60	0.8
	North East Scotland	1955-68	2.2
	Average		1.5
SCANDINAVIA	Copenhagen	1960-70	1.29
	Finland	1949-70	0.27
	Norway	1964-69	1.05
	Sweden (Central)	1956-67	2.5
	Sweden (Malmö)	1958-73	4.8
	Average		1.98
OTHERS	Baltimore	1960-63	1.8
	Basel	1960-69	1.6

Regional variations in incidence

Few data are available, but regional variations probably occur, as demonstrated by the Hospital In-patient Enquiry Data for 1966-1967 shown in Table III (Barker and Gardner⁴). It may be significant that, in women at least, the UC and CD rates are correlated, East Anglia having the lowest rate for both and South East Wales the highest.

Table III
Female discharge rates (Hospital In-patient Enquiry Data)

Inflammatory bowel disease	Region	Rate
CROHN'S DISEASE	East Anglia	40/million
	South East Wales	79/million
ULCERATIVE COLITIS	East Anglia	66/million
	South East Wales	155/million

Sex and age

Both UC and CD are predominantly diseases of young adults as typified by the data on CD from Malmö (Brahme *et al*⁵) and on UC from Tel Aviv (Gilat *et al*⁶) (Figures 1 and 2).

Fig. 1. Incidence of Crohn's disease in Malmö (Brahme *et al* 1975).

Fig. 2. Incidence of Ulcerative colitis in Tel Aviv (Gilat *et al* 1974).

Several reports (Brahme *et al*⁵² Evans and Acheson¹, Kyle⁷, Linden and Möller⁸, Norten *et al*⁹, Smith *et al*¹⁰, Tresadern *et al*¹¹) suggest that for both diseases there may be a "secondary peak" in old age as shown in Figure 3 for Chicago

Fig. 3. Incidence of Ulcerative colitis in Chicago showing "secondary peak" in old age (Rogers *et al* 1971).

(Rogers *et al*¹²). For CD there is some evidence that the "secondary peak" is caused largely by an increased incidence in colonic disease which also tends to affect more women than men.

Figures 4 and 5 show the relative sex incidence of the two diseases in various areas. For both diseases female preponderance seems to be most marked in the United Kingdom.

Fig. 4. The sex incidence of Crohn's disease in various areas.

Fig. 5. The sex incidence of Ulcerative colitis in various areas.

Race

It is often difficult to determine that differences apparently due to race are not in fact due to environmental factors. Nevertheless, the weight of the evidence strongly suggests that both diseases are approximately four-fold more common in Jews and five-fold less common in Negroes than in other ethnic groups (Brahme *et al*⁵, Evans *et al*¹, Monk *et al*¹³, Mosbech¹⁴, Novis *et al*¹⁵, Rogers *et al*¹²).

The extraordinary thing—if one accepts that epidemiological trends reflect aetiological factors—is that the racial pattern for the two diseases appears to be the same.

Effects of other demographic factors

Both UC and CD seem to be more common in urban than in rural areas (Couchman and Wigley¹⁶, Linden and Möller⁸, Kyle⁷, Monk *et al*¹³) the same phenomenon was probably observed in Chicago (Rogers *et al*¹²) where both diseases were found to be less common among farmers than others. No such difference, however, was noted for CD in Central Sweden (Norten *et al*⁹).

Evidence on the effect of social status or occupation is sparse and conflicting (Kyle⁷, Monk *et al*¹³).

Some reports (Rogers *et al*¹², Monk *et al*¹³) have suggested that IBD may be more common among those of higher educational attainment, but these data are open to several other possible interpretations.

Is the incidence of inflammatory bowel disease changing?

For CD, the only reliable information comes from Europe and is summarised in Figure 6. In both Nottingham and North East Scotland the reported increase in females greatly exceeds that in males whereas the reverse is true for Central Sweden. In Scotland there was a remarkable 12-fold increase in the incidence of colonic disease. In Clydesdale, compared with a 33 per cent increase in small bowel cases, there was a 100 per cent increase in purely large bowel cases with a marked female predominance (specially over the age of 50 years, when the sex ratio was eight females to one male).

Overall, the incidence of CD is increasing at a rate of 250 per cent per decade.

The little reliable information about the changing incidence of UC is represented in Figure 7. The incidence may be on the increase in most areas.

Fig. 6. The changing incidence of Crohn's disease in Europe.

Fig 7. The changing incidence of Ulcerative colitis in Europe.

Arguments that these increases may be more apparent than real are difficult to completely refute but (although space does not permit any elaboration) they are unlikely to account for large assessment errors.

Other possible epidemiological clues

a. Miller *et al*¹⁷ looked for "time-space clustering" as evidence for an infective aetiology of CD in the Nottingham area and found none.

b. Gardner and James¹⁸ reported that patients with CD ate significantly more cornflakes and wheat than controls.

c. Table IV shows the wide geographical variation in the incidence of other conditions known to be associated with UC. The significance of these variations is obscure.

Table IV
Ulcerative colitis — incidence of extracolonic manifestations

Manifestation	Area	Percentage
LIVER DISEASE	Australia	14.0
	Czechoslovakia	9.1
	England	7.4
	Israel	3.2
	Spain	2.4
	Turkey	20.0
ARTHROPATHY (including ankylosing spondylitis)	Great Britain (variously reported)	7.4
		2.7
		6.6
	Czechoslovakia	5.2
	Israel	4.8
	Spain	11.5
EYES DISEASES (Approximate)		0.5
		2.5
SKIN DISEASES (Approximate)		2.5

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