

Research letters

Socioeconomic status and stage at presentation of colorectal cancer

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The stage at which colorectal cancer presents varies by district of residence¹, but the reasons for this are not clear. We correlated stage at presentation with socioeconomic status in a stable UK population.

The pathology reports of 905 consecutive patients with colorectal cancer who had undergone transabdominal resection in Tayside between Jan 1, 1991, and Sept 30, 1997, were reviewed. Dukes' staging was derived from the reports. Socioeconomic status was determined with the Carstairs score, a deprivation index based on the postal-code areas from the 1991 census.²

Of the 905 patients, 128 were excluded due to absence of pathology reports on lymph-node involvement, and/or no record of postal code. 15% (n=120) of cases were stage A at diagnosis, 43% (n=330) stage B, and 42% (n=327) stage C. Patients with distant metastases were not considered because local registry data could not be relied upon to identify the primary lesion in all patients presenting with advanced cancer.

Patients were stratified in ascending order of social deprivation into four groups, according to the quartiles of Carstairs score. Group 4 was the highest score, and comprised people with the greatest socioeconomic disadvantage. The distribution of Dukes' stages in each of these four groups is shown in the table. From group 1 to group 4, there was a diminishing proportion of stage A, and an increasing proportion of stages B and C; the only exception was in group 2, where there was a slightly higher percentage of stage A, and a lower percentage of stage C than in group 1. The differences were significant ($\chi^2=9.93$, $p=0.019$, χ^2 for trend=7.7, $p=0.005$). Compared with patients from group 1, those in group 4 had an odds ratio of 0.47 (95% CI 0.25–0.86) of presenting at stage A, and of 2.13 (1.16–3.93) to present with stage B or C.

This study shows that people of low socio-economic status are more likely to present with advanced local disease. Some data were missing, but since our analysis was confined to resection samples, this can only have resulted from deficiencies in pathology reporting and absence of postal code information rather than differences in socioeconomic status. Furthermore, our sample was derived from a stable section of the UK population, mostly white (99%), and all were National Health Service patients under the care of one Health Board. Therefore, the results were unlikely to be affected by

differences in health-care provision because of race or private practice.

Other studies have found a more favourable relative survival in those living in higher socioeconomic areas but there is some doubt as to whether this is related to stage at presentation.³⁻⁵ In Tayside, stage at presentation does seem to vary with socioeconomic status. The most likely explanation is delay in diagnosis due to underuse of health-care facilities by deprived individuals.

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Shrinking areas and mortality

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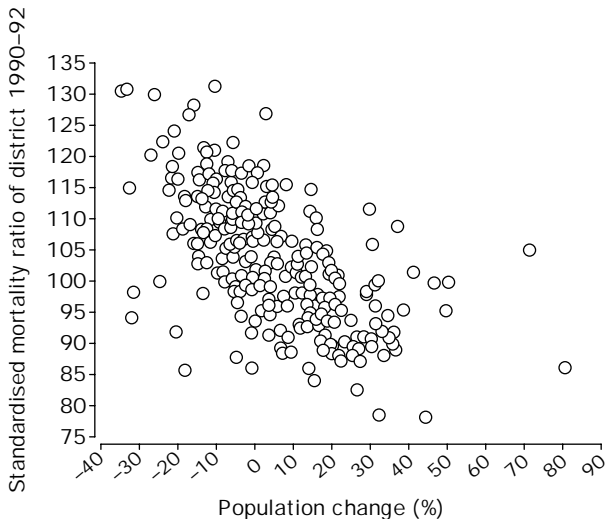
Differences in mortality rates according to residential areas have been reported for many years in the UK. Such differences were believed by William Farr 150 years ago¹ to show the "comparative salubrity of every part of England and Wales". A wide range of socioenvironmental factors, including climate, altitude, water constituents, latitude, specific occupational factors, pollution, the long-term effects of development during early life, and deprivation, have been thought to underlie the differentials.

An important characteristic of residential areas that has not been investigated in relation to mortality is the change in population because of people moving in and out of them. Areas with unfavourable social and physical environments are the ones people will, if possible, leave to move to more attractive places.² We therefore investigated the association between population change and mortality across Britain between 1971 and 1991. We used a previously described database,³ to calculate the population changes between 1971 and 1991 as percentage increases or decreases. These data include the gold standard population estimates, to protect against shrinking areas seeming to have raised standardised mortality ratios simply because of population underenumeration. We investigated the association between mortality in 1990–92 and population change in the two preceding decades across 292 areas (county boroughs and urban and rural remainders of counties) in Britain (figure).

| Groups | n | CS range | Stage A | Stage B | Stage C |
|--------|-----|----------------|----------|----------|----------|
| 1 | 171 | -5.44 to -3.55 | 31 (18%) | 70 (41%) | 70 (41%) |
| 2 | 205 | -3.55 to -1.23 | 41 (20%) | 87 (42%) | 77 (38%) |
| 3 | 199 | -1.23 to 1.44 | 29 (15%) | 84 (42%) | 86 (43%) |
| 4 | 202 | 1.44–5.97 | 19 (9%) | 89 (44%) | 94 (47%) |

CS=Carstairs score.

Distribution of Dukes' Stages in socioeconomic groups



Mortality in UK districts by population change 1971-91

In places where the population has shrunk, the average mortality is high compared with places in which the population has grown. The correlation between population change and all-cause standardised mortality ratios was -0.62 ($p < 0.001$); for standardised mortality ratios for the male population, the correlation was -0.68 ($p < 0.001$); and for the female population was -0.50 ($p < 0.001$). All correlations were weighted by population size in 1991, but weighting made little difference to the findings. Analysis of male and female cause-specific mortality showed strong correlations between population change and most broad cause-of-death groups (accidental deaths excepted).

To investigate whether the relation between population change and mortality merely reflects differences in degree of deprivation, we calculated partial correlations between all-cause standardised mortality ratios in men and women together and population changes between 1971 and 1991, controlling for the proportion of the population in social classes IV and V or with unclassified social class in 1991. The correlation was weakened but remained substantial at -0.49 ($p < 0.001$). Finally, we found the correlations between population change between 1971 and 1991 and change in standardised mortality ratio during 1969-73 and 1990-92 to be -0.37 ($p < 0.001$), which suggests that change in population size and change in mortality accompany each other.

Although most studies have tended to focus on economic factors (work and wages), people also move to improve their physical and social environment. The quality of life factors include issues such as cost of living, the image and ambience of a place, available amenities and services, notions of community, crime, pace of life, degrees of pollution, health-care provision, and quality of housing.²⁻⁴ These factors are thought to underlie differences in health statuses between areas, but they are not adequately indexed by conventional measures of deprivation. The people who remain in shrinking areas need environmental improvement and health services. At present, resources are allocated largely according to population size, and local and health authority budgets have therefore fallen most in these shrinking areas over time. New funding arrangements, such as health action zones⁵ will not reverse this trend.

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Magnetic resonance imaging to assess familial risk in relatives of women with endometriosis

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Endometriosis is probably inherited as a complex genetic trait, since among first-degree relatives of affected women, the prevalence of the disease, adenomyosis, or both is six to nine times higher than that in the population (about 1%).^{1,2} In a continuing study we are investigating the genetic basis of endometriosis by analysis of affected siblings with definition of phenotype as moderate to severe disease staged according to the revised American Fertility Society (1985) classification system.³

The need for a surgical procedure to diagnose endometriosis has restricted the number of families that could be identified for genetic linkage studies. Magnetic resonance imaging (MRI) of the pelvis, however, now offers a reliable, non-invasive method of diagnosis and the possibility of screening large numbers of women at risk. MRI has 90% sensitivity and 98% specificity for the diagnosis of endometriotic cysts.⁴ We aimed to assess the familial risk of endometriosis with MRI in the relatives of affected women. We obtained the approval of the Central Oxford Research Ethics Committee.

56 relatives of 29 probands with surgically confirmed moderate to severe endometriosis were approached; 47 (84%) agreed to have an MRI scan to determine disease status. Preliminary data of two relatives have previously been published.⁵ We used spin echo imaging with a 1.5 Tesla Signa system (GE Medical Systems). T2 weighted images were obtained in the coronal, sagittal, and axial planes. T1 weighted images were obtained in the axial plane with and without fat presaturations, the latter to identify area of methaemoglobin.

The 47 women (mean age 33.5 years [range 16-51]) in the 29 families were 33 sisters, two daughters, five nieces, and seven cousins; 27 (57%) women were symptom-free. Endometriosis was suspected in 15 (32%) women as ovarian cysts ($n=4$), peritoneal lesions ($n=2$), or as equivocal findings (lesions < 1 cm $n=9$). Adenomyosis was seen in 12 (26%) women, of whom four also had endometriosis. In 19 (58%) of 33 sisters, the MRI scans showed some evidence of endometriosis, adenomyosis, or both, which is a higher prevalence than one would expect. The incidence was 15% (five of 33) when we excluded women with equivocal findings, adenomyosis, or both. Results for all women are shown in the table. The relative risk in the nieces and cousins seems to be about half that in first-degree relatives, which further suggests a genetic basis for endometriosis. Three

| | First-degree relatives | Other relatives |
|---|------------------------|-----------------|
| Any evidence of endometriosis, adenomyosis, or both on MRI | 19/35 (54%) | 3/12 (25%) |
| Endometriosis on MRI (excluding equivocal findings and adenomyosis) | 5/35 (14%) | 1/12 (8%) |

MRI findings in all relatives