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## Relation between socioeconomic status and tumour stage in patients with breast, colorectal, ovarian, and lung cancer: results from four national, population based studies

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A table showing the availability of medical records by socioeconomic status appears on the *BMJ's* website

Although there is evidence that patients with cancer from deprived communities in Scotland might present with more advanced disease,<sup>1-3</sup> this finding has not been replicated in every study.<sup>4</sup> Using data from four population based audits, we investigated whether there is any relation between socioeconomic status and tumour stage at presentation in patients with breast, colorectal, ovarian, and lung cancer.

### Participants, methods, and results

For each audit potential study populations were identified from the Scottish Cancer Registry, and data were abstracted from medical records. The years of diagnosis for patients with breast, colorectal, ovarian, and lung cancer were 1993, 1993, 1992-4, and 1995, respectively.

The staging details examined were: pathological size, pathological nodal status, and metastatic status for breast cancers; Dukes' stage for colorectal cancers; Fédération Internationale de Gynécologie et d'Obstétrique stage for ovarian cancers; and a simple extent of disease classification based on clinical findings or investigations for lung cancers (as only 11% of cases had surgical resection), or both.

Medical records were available for 2518 patients with breast cancer, 2778 with colorectal cancer, 1387 with ovarian cancer, and 3855 with lung cancer, representing more than 90% of potentially eligible cases for each of the four cancer sites. A higher proportion of records was unobtainable for deprived than for affluent patients with lung cancer (11.7% *v* 7.0%,  $P < 0.001$ ) (see table on website). No significant differences were found in availability of medical records by deprivation grouping for the other cancers.

The table shows the distributions of variables for tumour staging by cancer site and deprivation grouping. *P* values for associations between the staging variables and deprivation were similar when unknown stages were excluded. We found no evidence that patients from deprived communities were likely to present with more advanced disease for breast or colorectal cancer. For ovarian cancer there was a possibility that deprived patients may have more advanced disease (see table); however, deprived patients with

lung cancer were more likely to present with localised disease (see table). Multivariate analyses, performed using log linear modelling, showed no evidence of age dependent relations between stage of disease and deprivation. The four age groups used for these analyses differed by cancer site because they were predefined by different specialist groups—for example, the breast cancer specialists included a category for screening age group (50-64 years).

### Comment

We found no consistent evidence that patients from deprived communities present with more advanced disease for breast, colorectal, ovarian, or lung cancer. Despite the introduction of breast screening and differential uptake by socioeconomic status,<sup>5</sup> our results for breast cancer remain similar to those of Carnon et al.<sup>4</sup> However, another recent but smaller study from the west of Scotland found that women from deprived areas were more likely to present with locally advanced or metastatic disease.<sup>3</sup> Our result for colorectal cancer conflicts with those of a study from Tayside, although the latter was based on cases for which there was a record of disease, and so not population based, and excluded patients with distant metastases.<sup>2</sup> The result for ovarian cancer was of borderline significance, although patients with stage unknown had a generally worse prognosis than those with stage IV disease, presumably reflecting inoperability. The greater likelihood of deprived patients with lung cancer presenting with localised disease could be an artefact resulting from differential availability of medical records across the socioeconomic groupings or, owing to comorbidity, less intensive investigation of these patients leading to less accurate data for staging. Alternatively, it might reflect a lower threshold for investigation and referral in patients from deprived communities presenting with suspicious symptoms, because they are more likely to be current smokers. Further research is needed to investigate the contribution of tumour, host, and treatment related factors to outcome.

Relation between socioeconomic status and tumour stage in patients with breast, ovarian, colorectal, and lung cancer. Values are numbers (percentages)

	Deprivation group*			Total
	Affluent	Middle	Deprived	
<b>Breast cancer†</b>	n=548	n=1605	n=364	n=2517
Tumour size (mm):				
0-20	271 (49.5)	730 (45.5)	166 (45.6)	1167 (46.4)
21-50	124 (22.6)	409 (25.5)	109 (29.9)	642 (25.5)
>50	14 (2.6)	49 (3.1)	13 (3.6)	76 (3.0)
Unknown	139 (25.4)	417 (26.0)	76 (20.9)	632 (25.1)
Significance	$\chi^2=9.89$ , df=6, P=0.13			
Node status:				
Positive	144 (26.3)	467 (29.1)	111 (30.5)	722 (28.7)
Inadequate negative sample‡	58 (10.6)	178 (11.1)	31 (8.5)	267 (10.6)
Negative§	208 (38.0)	523 (32.6)	128 (35.2)	859 (34.1)
Unknown	138 (25.2)	437 (27.2)	94 (25.8)	669 (26.6)
Significance	$\chi^2=7.79$ , df=6, P=0.25			
Metastatic status at presentation				
M0	517 (94.3)	1492 (93.0)	331 (90.9)	2340 (93.0)
M1	31 (5.7)	113 (7.0)	33 (9.1)	177 (7.0)
Significance	$\chi^2=3.89$ , df=2, P=0.14			
<b>Colorectal cancer†</b>	n=590	n=1734	n=453	n=2777
Dukes' stage:				
A	61 (10.3)	149 (8.6)	38 (8.4)	248 (8.9)
B	202 (34.2)	576 (33.2)	156 (34.4)	934 (33.6)
C	130 (22.0)	415 (23.9)	97 (21.4)	642 (23.1)
'D'	117 (19.8)	377 (21.7)	101 (22.3)	595 (21.4)
Unknown	80 (13.6)	217 (12.5)	61 (13.5)	358 (12.9)
Significance	$\chi^2=4.74$ , df=8, P=0.79			
<b>Ovarian cancer†</b>	n=304	n=856	n=226	n=1386
Fédération Internationale de Gynécologie et d'Obstétrique stage:				
I	73 (24.0)	191 (22.3)	33 (14.6)	297 (21.4)
II	30 (9.9)	77 (9.0)	14 (6.2)	121 (8.7)
III	126 (41.4)	388 (45.3)	108 (47.8)	622 (44.9)
IV	51 (16.8)	131 (15.3)	44 (19.5)	226 (16.3)
Unknown	24 (7.9)	69 (8.1)	27 (11.9)	120 (8.7)
Significance	$\chi^2=14.96$ , df=8, P=0.06			
<b>Lung cancer</b>	n=534	n=2371	n=950	n=3855
Clinical stage:				
Localised	152 (28.5)	758 (32.0)	342 (36.0)	1252 (32.5)
Regional	134 (25.1)	628 (26.5)	214 (22.5)	976 (25.3)
Distant	183 (34.3)	726 (30.6)	295 (31.1)	1204 (31.2)
Unknown	65 (12.2)	259 (10.9)	99 (10.4)	423 (11.0)
Significance	$\chi^2=13.52$ , df=6, P=0.04			

\*Patients were assigned to a 1991 census derived Carstairs deprivation category based on their postcode sector of residence at diagnosis. Carstairs deprivation categories: 1 and 2, affluent; 3, 4, and 5, middle; 6 and 7, deprived.

†Deprivation score could not be assigned for one case.

‡Represents 1, 2, 3, or unknown number of nodes sampled, all negative.

§Represents 4 or more nodes sampled or axillary clearance, all negative.

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### Endpiece

#### Oh yes

Dud: So would you say you've learned from your mistakes?

Pete: Oh yes, I'm sure that I could repeat them exactly.

Peter Cook quoted by Brian Eno in  
*The diary of Brian Eno*,  
London: Faber & Faber, 1996