Factors Affecting Receipt of a Medical Card in a Cohort of Colorectal Cancer Patients, 2002-2006

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Abstract
The criteria for allocation of medical cards to colorectal cancer patients <70 were explored. All invasive colorectal cancers diagnosed during 2002-2006 were abstracted and linked to the PCRS master file to determine medical card status. Determinants of medical card possession before diagnosis were: age 65-69yr vs. 15-54yr (OR=3.85;95%CI;3.20-4.88), other status vs. married (OR=0.89;0.61-1.32), most vs. least deprived (OR=3.65;2.89-4.61), smoker vs. non-smoker (OR=1.98;1.64-2.37). ED population density (<1/ha vs. >5/ha; OR=0.57;0.28-1.16). Determinants of medical card possession after diagnosis were: age 65-69yr vs. 15-54yr (OR=0.77;0.62-0.96), most vs. least deprived (OR=0.71;0.57-0.89), stage IV vs. I: OR=0.87;0.53-1.43). Medical card possession at the time of diagnosis could apply for one on hardship grounds following diagnosis. The awarding of a card to those who apply is administered through community welfare officers and the system is discretionary. In general little is known about patterns of medical card possession among cancer patients in Ireland, or about which factors determine receipt after diagnosis. We identified factors associated with possession of a medical card before diagnosis in a population-based series aged under 70 years with colorectal cancer, the second most commonly diagnosed cancer in Ireland. We also for the first time in Ireland - identified factors associated with receipt of a medical card after date of diagnosis in those cases who did not have one before diagnosis.

Introduction
A cancer diagnosis can have significant financial implications for individuals and their families. Direct costs may include costs of appointments with health professionals, hospitalisation, tests, procedures and treatment and out-of-pocket expenses. In Ireland, 45% of cancer patients had paid to see a consultant or other hospital clinician, and 36% had paid to see a GP about their cancer. The average amounts spent were €45 for consultant fee and €250 for GP fees. In addition, almost 30% of patients had had out-of-pocket expenses for supportive medications. Approximately 30% of the population held a medical card in 2007. Eligibility is means tested in those less than 70 years and, from the middle of 2001 until the beginning of 2009, entitlement was universal on attaining 70th birthday. The level of medical card coverage for this age group rose from 79% in 2001 to 95% in 2007. Cancer patients who were not already in possession of a medical card at the time of diagnosis could apply for one on hardship grounds following diagnosis. The awarding of a card to those who apply is administered through community welfare officers and the system is discretionary. In general little is known about patterns of medical card possession among cancer patients in Ireland, or about which factors determine receipt after diagnosis. We identified factors associated with possession of a medical card before diagnosis in a population-based series aged under 70 years with colorectal cancer, the second most commonly diagnosed cancer in Ireland. We also for the first time in Ireland - identified factors associated with receipt of a medical card after date of diagnosis in those cases who did not have one before diagnosis.

Methods
Cases were abstracted from the National Cancer Registry (NCR) on all invasive colorectal cancers (ICD-02, C18 colorectal adenocarcinoma codes) diagnosed between 01/02/2002-31/12/2006 (Figure 1). The NCR records all cancers diagnosed in the population usually resident in Ireland. Completeness of registration is estimated to be approximately 97%.

Information was abstracted on patient characteristics (e.g. date of birth, gender), clinical details (e.g. date of incidence, stage at diagnosis, tumour site). Using T,N,M data, cases were assigned an AJCC summary stage (I-IV) (OR=1.6;1.33-1.93). 38% of cases resident in ED's with low population density (<1/ha) held medical cards compared to 44% of those in the most deprived areas (OR=3.65;2.89-4.61). 44% of smokers held a card relative to 29% of non-smokers (OR=1.89;1.64-2.17). 38% of cases resident in EDs with low population density (<1/ha) held medical cards compared to 30% of cases resident in EDs with high population density (>15/ha) (OR=0.71;0.57-0.89). HSE West vs. DNML (OR=0.74;1.40-2.17). Medical card possession among colorectal cancer patients was determined by greater age and deprivation before diagnosis; and younger age, greater deprivation, advanced stage and treatments warranted by extent of disease after diagnosis. Low population density of ED of residence also predicted card receipt.

Results
During 2002-2006, 10,284 new cases of invasive colorectal cancer were diagnosed in Ireland; 4,762 were aged <70 years, 32% of whom (1,547) held a medical card at diagnosis (Figure 1).

Medical card possession at time of diagnosis
In multivariate analyses (Table 1), medical card possession at diagnosis increased with age, from 21% in those under 55 years to 64% in those aged 65-69 yrs (OR=3.95;95%CI;3.20-4.88). Higher income, quintiles of deprivation were derived for cases by linking the address of the case at diagnosis to an electoral division (ED). Medical card possession among colorectal cancer patients was determined by greater age and deprivation before diagnosis; and younger age, greater deprivation, advanced stage and treatments warranted by extent of disease after diagnosis. Low population density of ED of residence also predicted card receipt.

Figure 1: Colorectal cancer in Ireland: 2002-2006, Study flow and cases

Figure 2: Colorectal cancer in Ireland: 2002-2006, Time of receipt of medical cards in 1,435 cases who obtained a medical card after diagnosis
Medical card receipt after diagnosis

Of the remaining 3,215 cases who did not have a card at diagnosis, 1,435 (45%) subsequently obtained a medical card before their 70th birthday at various times after diagnosis (figure 1); 53% received it within 3 months of diagnosis, 74% within 6 months, 82% within 9 months and 90% within 18 months of diagnosis (figure 2). In multivariate analyses (Table 4), cases resident in the most deprived areas were less likely to receive a medical card relative to those resident in the least deprived areas (OR=0.77;0.62-0.96). 52% of those resident in the most deprived areas held a medical card compared to 33% of those in the least deprived areas (OR=2.15;1.72-2.70). 57% of cases with stage IV disease received a medical card compared to only 25% of cases with stage I (OR=2.49;1.85-3.36). Cases who received chemotherapy (OR=2.30;1.87-2.83) or radiotherapy (OR=1.46;1.13-1.82) were significantly more likely to obtain a card post-diagnosis. Cases resident in low population density EDs (c/ha) were more likely to receive a card relative to cases from high population density EDs (OR=1.47;1.91-1.82). Cases resident in HSE South (57%) were more likely to receive a medical card compared to cases from DNM (38%) (OR=1.74;1.46-2.11).

Discussion

Two-thirds of all those with colorectal cancer held a medical card at the time of diagnosis, which was twice as high as the figure for the general population (30%). This was probably due to the age structure of the population; the median age at diagnosis was 71 years. Among those <70 yrs, 32% held a medical card, which was in line with that of the general population for the same period. Similarly, card possession among those 70 and older (89%) was consistent with the general population (79-95% between 2001-2007). Income threshold is the prime determinant of who receives a medical card. Our aim was to identify other factors that influenced who held a medical card, and who got one after diagnosis. In the absence of income information we derived ED based quintiles of deprivation as a proxy for income. There were 3,215 cases who did not have a card at diagnosis, 1,435 (45%) of whom subsequently obtained a medical card after diagnosis. This figure was similar to that reported from a survey of individuals with breast, prostate and lung cancer. In the <70 years subset, we found that a colorectal cancer case was more likely to hold a medical card at diagnosis if they were: female; unmarried; a smoker; aged 65-69 years; from a sparsely populated and deprived area within the west or south of the country. In contrast, after diagnosis, a case was more likely to receive a medical card if they were: <55 years; with stage III/IV tumour; required chemotherapy and/or radiotherapy; and lived in a more deprived and sparsely populated area within the south of the country.

A systematic review showed that residence in rural areas, lower educational attainment, and tumour in rectum were linked with delayed presentation in colorectal cancer. Delayed presentation with tumour in the rectum was observed in cases with lower socio-economic status (SES) and single status in Denmark. Similarly, lower SES was a predictor of delayed presentation in colorectal cancer in the US. These types of associations may explain the observed relationships between deprivation, stage and medical card possession after diagnosis. The fact that married persons were less likely to have a card at diagnosis was probably because the couple had means in excess of the threshold for a medical card.

Smokers are over represented in the lower SES groups which explains why they were more likely to hold a medical card at time of diagnosis. Unemployment is associated with male colorectal cancer in Ireland with a steady increase in risk as the unemployment levels in an ED increased. This dataset is in keeping with that finding; males were marginally over represented in the most deprived quintiles; 33% males and 30% females. There is a strong perception among both oncology social workers and cancer patients that there is geographical variation in the ease with which medical cards are obtained in individuals after diagnosis with cancer. This study provides evidence that such variation does exist. Why those residing in HSE South should have higher levels of medical card receipt after diagnosis is unclear, especially as the model adjusted for factors such as age, stage, population density and deprivation. The HSE areas which had higher levels of card possession at diagnosis also had a higher level of card receipt post-diagnosis, which suggests that some administrative, rather than individual-level, factors must explain the associations.

This study was not able to take into account personal income and some other potentially important determinants (i.e. co-morbidities, and case mix) which could explain differences between the HSE Eastern and HSE South/West regions. Application for a medical card is made in writing to the HSE using form MC1.8 Question E, part 4 of form MC1, is concerned with exceptional circumstances leading to financial hardship, such as travel, accommodation and childcare costs related to attending clinics or hospitals. Previous research has shown that cancer patients may have considerable out-of-pocket expenses associated with attending treatment appointments. We have shown that the persons from more sparsely populated areas tended to satisfy the criteria for a medical card and that this partially accounts for the greater card possession in HSE South/West when compared with the HSE Eastern areas.

Because the system for obtaining a medical card on hardship grounds after the diagnosis of cancer is discretionary, and the decision on whether to award a card ultimately lies with the local community welfare officer, it is perhaps inevitable that there are unexplained variations in the distribution of cards. These findings show that medical card possession before diagnosis of colorectal cancer is determined by deprivation status, and greater age. After diagnosis, cards are allocated to younger cases based on deprivation and treatments warranted by more extensive disease. Population density and HSE area of residence was also predictive of who received a medical card.
medical card. Whatever the reasons for this, we have highlighted unequivocally that regional differences in medical
card possession with colorectal cancer do exist.

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