Subsite Distribution and Incidence of Colorectal Cancer in New Zealand, 1974–1983

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The purpose of this study was to examine changes in subsite distribution and incidence of colorectal cancer within different age groups. Registration of colorectal cancer by the National Cancer Registry of New Zealand approached 100 percent by 1974. The present study was based on 15,395 individuals aged 25 years and over and registered for colorectal cancer between 1974 and 1983. Subsite distribution (right colon, left colon, rectum) for different age groups (25–49, 50–69, 70+ years) was significantly skewed, with an excess of right colonic cancer in individuals aged 25–49 years and 70+ years. This right colonic excess was accompanied by a relative reduction in left colonic cancer. Age adjusted incidence rates for the periods 1974–78 and 1979–83 were compared and stratified by age group and subsite. Incidence rates increased in all subsites in individuals aged 50+ years. This was particularly evident for right sided cancer in the elderly of both sexes. There was a marked reduction in the incidence of left colonic cancer and rectal cancer in individuals under 50 years. In contrast, the incidence of right colonic cancer remained relatively stable in young individuals. Time trend studies indicate that the skewed subsite distribution of large bowel cancer in different age groups may increase with time and is probably due to varying etiological factors acting on different cohorts. [Key words: Colon; Rectum; Cancer; Epidemiology; Incidence]

The influence of age and sex on the subsite distribution of large bowel cancer has been addressed previously. A widely reported pattern of change with time has been a decrease in the relative frequency of left-sided cancer and a corresponding increase in the relative frequency of right-sided colonic cancer. The last has been particularly evident in females. These observations are of considerable importance in highlighting possible differences in the etiology and/or pathogenesis of large bowel cancer according to subsite.

The importance of detailed subsite division in relation to furthering our understanding of the etiology of colorectal cancer has been emphasised by both epidemiologists and cancer geneticists. However, many reports have emanated from single institutions and the number of patients has often been relatively small. Furthermore, as stated in one report, it is usually unclear whether the change in distribution has been due to a change in referral patterns or diagnostic capabilities, or an actual increase in the incidence of proximal lesions, or decrease in the incidence of distal lesions, or both. In addition, anatomic distribution and time trend studies have rarely heeded effects within different age bands or else have produced conflicting findings. However, numbers are small and difficult to interpret for cancers in young individuals, even when National or Regional Registry data are analyzed. Nevertheless, findings may be particularly important in this group. It should be appreciated that hereditary nonpolyposis large bowel cancer often affects individuals under the age of 50 and shows a predilection for the proximal colon. Although only 5 percent of large bowel cancer is thought to develop on the basis of an hereditary syndrome, the existence of this entity could be a confounding variable in epidemiologic surveys.

A previous study examined subsite incidence of large bowel cancer for all New Zealand patients between 1972 and 1975. The aim of the present study was to examine and compare the subsite distribution and age standardized incidence rates in two consecutive 5-year periods (1974–79 and 1979–83). In addition, stratification by age bands...
25–49, 50–69, and 70+ years was undertaken to assess the relation of age at registration to subsite distribution as well as to time trends.

**METHODS**

The study was based on the records of 15,395 patients aged 25 years and over collected by the National Cancer Registry (NCR) of New Zealand between 1974 and 1983. The NCR has estimated the registration rate to be virtually 100 percent by 1974.\(^{15}\) Up to 1979 the following subsites were coded: ascending colon (including cecum and appendix), transverse colon (including flexures), descending colon, sigmoid colon, colon—site unspecified or multiple, rectosigmoid, and rectum. From 1980 appendix, cecum, hepatic flexure, and splenic flexure were coded separately. Because appendiceal carcinoma could not be identified before 1980, this was grouped with cecal carcinoma for the years 1980–1983. The number of appendiceal carcinomas was very small and would have no bearing on the findings.

Patients were grouped by age as 25–49 years, 50–69 years and 70 years or older. Because of the resulting reduction in numbers, particularly in the young age group, subsites were collapsed into right colon (up to and including splenic flexure), left colon (descending and sigmoid colon), and rectum (including rectosigmoid). To calculate age-adjusted incidence rates, New Zealand populations for the years 1976 and 1981 were used as the denominator. Distribution of cancer according to age band and incidence rates according to age band and subsite were compared in individuals registered between 1974 and 1978 and between 1979 and 1983.

**RESULTS**

For the two periods 1974–78 and 1979–83 the number of registered patients increased from 3330 to 3943 for males and from 3768 to 4354 for females. However, the number of cases of colon, site unspecified fell from 252 to 172 for males and from 359 to 243 for females. The more meticulous subsite assignment in recent years will have the effect of inflating the number of colonic cancers occurring in the second period. However, the numbers are small and the distortion will be minimal in most instances.

The distribution of cancer within right colon, left colon and rectum in the periods 1974–78 and 1979–83 was similar in relation to rectum vs. colon but differed slightly for right colon vs. left colon (Table 1). In both males and females there was a shift toward the right colon with a corresponding reduction of left colonic malignancies in the second quinquennium.

When the total series is stratified by age, distribution of colorectal cancer by site becomes skewed (Table 2). Again there is little difference between rectum and colon for the three age groups, but significant differences for right colon vs. left colon are evident in both males and females. In males a relative shift in distribution from left colon to right colon occurs in the young group (25 to 49 years) and elderly group (70+ years) as compared to the middle-age group (50 to 69 years). The difference between young and middle-aged females is less evident, with the right colon being the site of predilection at all ages. However, the right-sided predilection is enhanced in the elderly, as in males.

The mean annual incidence of cancer for the periods 1974–78 and 1979–83 stratified for both site and age group is shown in Table 3. The incidence of left-sided colonic cancer and rectal cancer has fallen markedly in individuals under the age of 50. In right-sided cancer there has been a small reduction in incidence in males and a small increase in females under 50 years. In males aged 50–70 years, incidence rates have increased by a similar factor for all sites, but over the age of 70 the main increase occurs in the right colon whereas

<table>
<thead>
<tr>
<th>Quinquennia</th>
<th>Males</th>
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<th>Females</th>
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<tbody>
<tr>
<td></td>
<td>RC (%)</td>
<td>LC (%)</td>
<td>R (%)</td>
</tr>
<tr>
<td>1974–78</td>
<td>915 (29.7)</td>
<td>883 (28.7)</td>
<td>1280 (41.6)</td>
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<tr>
<td>1979–83</td>
<td>1191 (31.6)</td>
<td>986 (26.1)</td>
<td>1594 (42.3)</td>
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RC = right colon; LC = left colon; R = rectum.