N. IRELAND Cancer Registry

Monitoring care of colorectal cancer patients in Northern Ireland diagnosed 2006 (with comparisons 1996 & 2001)

Colorectal **1996-2006**

Queen's University Belfast

Monitoring care of colorectal cancer patients in Northern Ireland diagnosed 2006 (with comparisons 1996 & 2001)

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Contents

FOREWORD

This report describes the characteristics of patients with colorectal cancer and their care in 2006. It also makes comparisons with the care received by patients with these conditions in 1996 and 2001. The report introduces the third phase of a process, supported by local clinicians and the cancer network (NICaN), where the care of cancer patients and their survival is documented in detail. In building on the information for patients diagnosed in 1996 and 2001, it demonstrates some welcome changes in service organisation.

It is very reassuring to have evidence of improved services which reflects excellent, co-operative working of professionals and the investment in services. However we must continue to strive for further improvement in the quality of care and outcomes for all patients. The introduction this year of the Northern Ireland Bowel Cancer Screening Programme is an important landmark which will make a significant contribution in reducing the morbidity and mortality associated with bowel cancer.

This report provides valuable information which is essential in helping us to track our progress and identify those areas where change is still needed. This series of reports highlights the importance of the Cancer Registry as a valuable public health tool which has grown and developed significantly over the last few years and now plays a leading role in monitoring cancer care within Northern Ireland.

Dr Michael McBride
Chief Medical Officer

ACKNOWLEDGEMENTS

This report has been compiled in collaboration with the Northern Ireland Cancer Network (NICaN) Regional Colorectal Group. I am grateful to the clinicians who helped with determining the data items to collect, their interpretation and final presentation.

The N.Ireland Cancer Registry is funded by the Public Health Agency of Northern Ireland and its audit work is facilitated by grants from the Guideline and Audit Implementation Network (GAIN).

The quality of data in this project is a result of the work of the Registry Tumour Verification Officers, Julie McConnell, Kate Donnelly, Rosemary Ward and the late Anita Jones, who meticulously extracted detailed information from clinical records for analysis and presentation in this report. Data abstraction was facilitated by Colin Fox of the Registry's IT group. The analysis of data was undertaken by Deirdre Fitzpatrick. A special word of gratitude to the Medical Records staff of all the hospitals in Northern Ireland who have facilitated the Registry in this work and the colorectal surgeons who have commented on this report.

The work of the N.Ireland Cancer Registry, including the production of this report, is the result of the work of the Registry team. I wish also to record my thanks to the Steering Group and Council of the Registry who guide that work.

This report is dedicated to the memory of Anita Jones, a valued member of the Registry team, who has been missed deeply by all since her death at an early age in 2009.

A Gavin
Director, NICR
2009

NORTHERN IRELAND CANCER NETWORK – REGIONAL COLORECTAL GROUP

The Northern Ireland Cancer Network (NICaN) is a managed clinical network working towards the continuous improvement in cancer care and cancer survival for the people of Northern Ireland. It aims to promote equitable provision of high quality, patient focused and clinically effective cancer services. The way in which this is being achieved is by supporting groups of health professionals, patients and voluntary sector representatives to work together in a co-ordinated way across geographical, organisational and professional boundaries.

For colorectal cancer, a multiprofessional multidisciplinary group meets regularly to drive forward the agenda of improving the care and outcomes for people with colorectal cancer. The group's remit includes being the authoritative source of expertise and guidance to planners, commissioners and providers of service. It indicates service reconfiguration, and resource implications required to achieve the highest quality care, review existing standards and guidelines and develop regionally agreed standards of care which are periodically monitored/ audited; and prioritise resources within colorectal cancer service developments.

The Regional Group, chaired by Mr Roy Maxwell, has played an active role in the development of the cancer service framework and progressed a number of work areas including workforce reviews, regional patient information pathways, and the creation of a colorectal cancer support group.

Patients and their carers have been ably represented by Mrs Sheila McQuaid and Mr Victor Blease to whom we owe a debt of gratitude.

The work of N.Ireland Cancer Registry in producing audit figures such as in this report allows clinicians and NICaN to consider where improvements may be needed.

Network website: http://www.cancerni.net/og/colorectalgroup

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SECTION I – INTRODUCTION, BACKGROUND & METHODS

INTRODUCTION

This Report is one of a series which examines in detail the pathway of care for cancer patients in Northern Ireland in the years 1996, 2001, and 2006. Colorectal cancer represents a major cancer and this report assesses change in service provision over a 10 year period.

The changes in service provision are driven by recommendations and guidance developed by several working groups and public bodies. The key documents providing guidance for the optimum treatment and care of colorectal cancer patients are:

- In 1996 the Campbell Report[1], which resulted from the work of many clinicians, service planners and patients, made 14 recommendations with the aim of improving cancer services in Northern Ireland (see Appendix A).
- Also in 1996 and subsequent to the publication of the Campbell Report, a Cancer Working Group produced a sub-group report on colorectal cancer[2]. This made 14 specific recommendations in relation to colorectal cancer services in Northern Ireland (see Appendix B).
- In 2001, the Association of Coloproctology of Great Britain and Ireland (ACPGBI) produced a report[3] "Guidelines for the Management of colorectal Cancer", a summary of which is included in Appendix C.
- In 2003, the Scottish Intercollegiate Guidelines Network (SIGN) produced a national clinical guideline[4] for the management of patients with colorectal cancer.
- In 2004, the National Institute for Health and Clinical Excellence (NICE) published guidance on Improving Outcomes in Colorectal Cancer for the NHS in England and Wales[5]. This was an updated version on that previously published in 1997, some of the original recommendations have been updated, and further recommendations have been added (see Appendix D).

In 2005, the N. Ireland Cancer Registry (NICR) produced a cancer services audit of colorectal cancer patients diagnosed in Northern Ireland in the years 1996 and 2001[6], which made the following recommendations:

a) Some patients had serious symptoms for over one year. This points to the need to raise awareness of symptoms among the population.

b) The number of operators and hospitals treating colorectal cancer is too high. There needs to be more specialisation.

c) Retrospective note review is dependent on completeness and accuracy of the data in the notes. Efforts should be made to increase availability of data collected prospectively.

COLORECTAL CANCER BACKGROUND

Aetiology and risk factors

The specific causes of colorectal cancer are unknown, but environmental, nutritional, genetic/familial factors and pre-existing diseases of the colon are all associated with this cancer.

Environmental factors

The fact that Asians, Africans and South Americans assume the higher colon cancer risk of their adopted country within a few generations gives evidence to the role of environmental factors in its development[7].

Nutritional and lifestyle

Results from a large international study investigating links between cancer and nutrition has confirmed that colorectal cancer risk is associated with high consumption of red meat, while a diet high in fish is protective[8]. Dietary fibre in this study is also shown to be protective[9]. The combination of these dietary factors plays a major role in colorectal cancer as do lifestyle factors – alcohol[10] and smoking[11], obesity and low physical activity[12]. Post menopausal hormone use (combines oestrogen and progesterone)[13] and prolonged use of non-steroidal anti-inflammatory drugs has been shown to protect against colorectal cancer[14].

Pre-existing conditions

Patients with pre-existing inflammatory bowel disease (e.g. ulcerative colitis) have a higher than average risk of colorectal cancer. The risk increases with the duration of the condition to 30% by the third decade of colitis. Colorectal tumours develop more often in patients with adenomatous (benign) polyps than those without such polyps. The risk of polyps undergoing cancerous change is related to their size and the histological type, with polyps larger than 2cm having a 40% chance of malignant transformation[15].

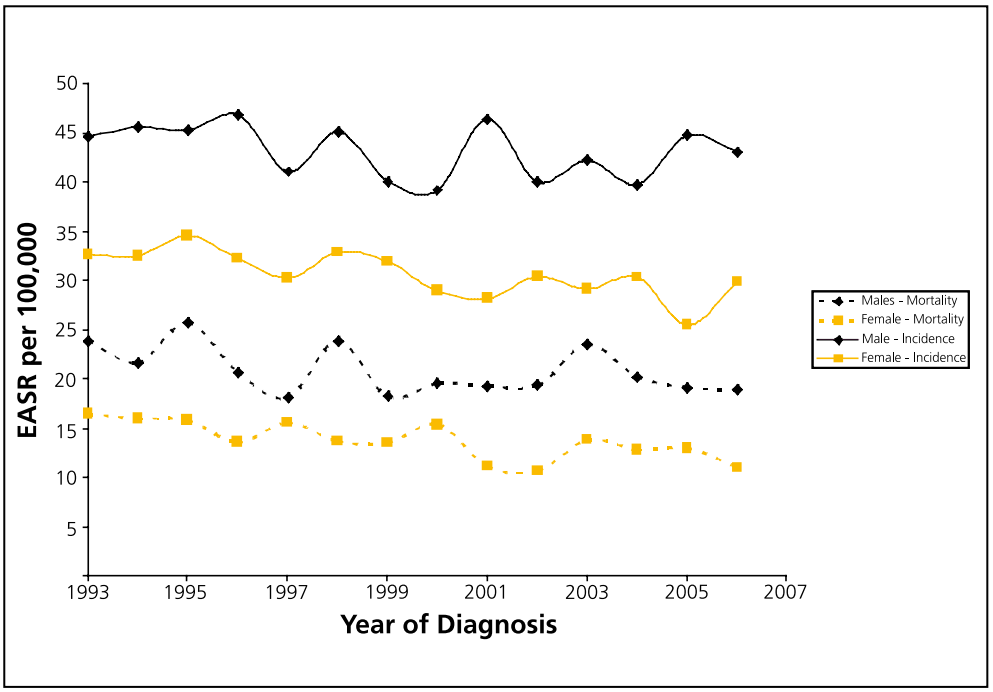
Genetic factors

The risk of developing colorectal cancer is significantly increased in several forms of inherited susceptibility, which accounts for 5% of all colorectal cancers. Familial Adenomatous Polyposis (FAP) is inherited in an autosomal dominant fashion. These patients develop colonic and rectal polyps from an early age and if left untreated, all will develop colorectal cancer by the third or fourth decade. For this reason these high risk patients usually have their colon removed as a precaution. Hereditary non-polyposis colorectal cancer (HNPCC) is also inherited as an autosomal dominant genetic defect. FAP and HNPCC families are offered genetic testing to identify whether or not individuals are gene carriers so that they can be offered colorectal cancer screening from an early age. A third group of patients are at risk of colorectal cancer due to a strong family history of colorectal cancer, the exact genetic transmission of which has yet to be determined.

Colorectal cancer in Northern Ireland

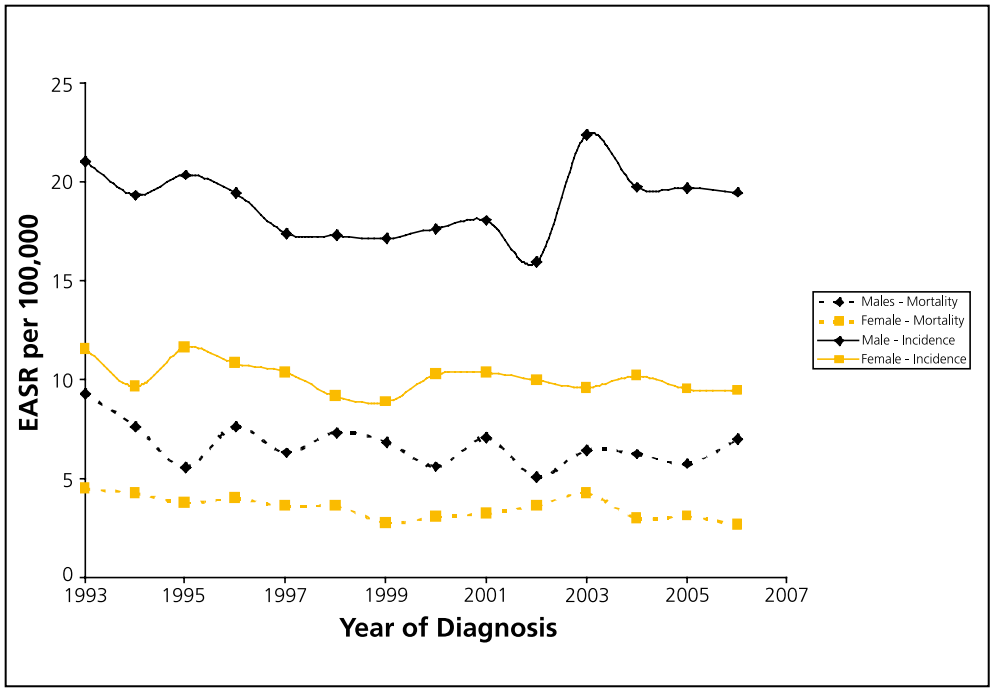
In Northern Ireland, from 1993-2006, on average 501 men and 451 women were diagnosed with colorectal cancer each year, and 222 men and 207 women die annually from this cancer. For patients with cancer of the colon & rectosigmoid junction (RS), on average 344 men and 333 women were diagnosed annually, and 167 men and 164 women die annually from this cancer. For patients with cancer of the rectum, on average 150 men and 108 women were diagnosed annually, whilst 54 men and 42 women die annually from this cancer.

Figure 1. Trends in incidence and mortality for cancer of the colon & RS junction in N.Ireland 1993-2006



Rates are falling in women but remain steady in men. Female patients with cancer of the colon & RS junction, had statistically significant downward trends in European age-standardised incidence (P<0.01) and mortality rates (EASR) (P<0.01) (Figure 1). Female patients with cancer of the rectum exhibited significant downward trends for mortality rates (P<0.01) (Figure 2).

Figure 2. Trends in incidence and mortality rates for cancer of the rectum in N.Ireland 1993-2006



STUDY METHODS

Data Collection

Registry Tumour Verification Officers (TVOs) collected data by reviewing clinical notes of patients with a new primary colorectal cancer already registered with NICR. This, in many cases, involved review of notes from several hospitals. Data were then entered into an electronic proforma, which had been developed with the guidance of relevant clinicians; copy available at www.qub.ac.uk/nicr/racc

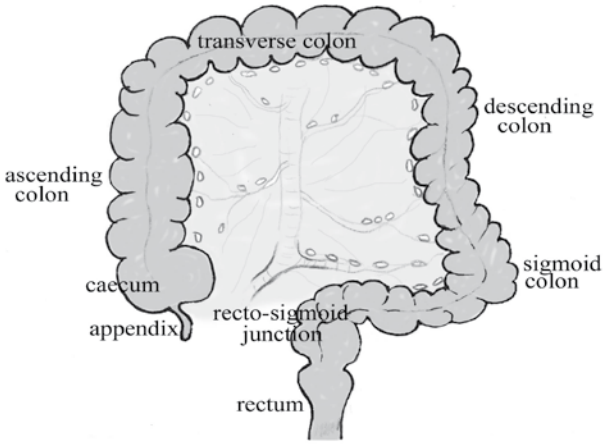
Exclusions and analyses

Patients were excluded if their records lacked sufficient information or if information was available only from a death certificate (DCO). It was also decided to remove histological types such as lymphomas, sarcomas and carcinoids because their natural history and management are different from those of other colorectal cancers. After cleaning and validation, data analysis was carried out using SPSS. Chi-square was used to test for significance, where appropriate, throughout the report. The Kaplan-Meier method was used for survival analysis.

Classification

It is difficult to meaningfully group tumours of the colon, rectum, RS junction and anus in a report such as this. Following consultation with the clinicians it was agreed that for the purposes of this audit report, tumours in each of the four areas would be considered individually for some analyses, but for the majority of analyses, colon and RS junction tumours would be grouped together and rectal tumours would be dealt with separately. Numbers for anal tumours are so small these are not reported separately in analyses but are included in 'colorectal totals' where applicable. The following ICD10 classification codes were used, C18 (malignant neoplasm of colon), C19 (malignant neoplasm of RS junction), C20 (malignant neoplasm of rectum) and C21 (malignant neoplasm of the anus and anal canal).

Colon, rectosigmoid junction, rectum and anus



SECTION II – RESULTS OF COLORECTAL CANCER AUDIT

Study patients

	Colon (C18)			RS junction (C19)		
	1996	**2001**	**2006**	**1996**	**2001**	**2006**
Total number of patients	490	515	590	47	102	71
Exclusions – DCO*	1	1	0	0	0	0
Exclusions – Insufficient information	14	11	7	2	6	0
Total exclusions	15	12	7	2	6	0
Total Reported on (% of all patients)	475 (97%)	503 (98%)	583 (99%)	45 (96%)	96 (94%)	71 (100%)
Total Reported on – Male (%)	242 (51%)	261 (52%)	304 (52%)	26 (58%)	57 (59%)	42 (59%)
Total Reported on – Female (%)	233 (49%)	242 (48%)	279 (48%)	19 (42%)	39 (41%)	29 (41%)
Average age at diagnosis – Male	69	70	71	70	67	66
Average age at diagnosis – Female	70	72	72	70	65	72
	Rectum (C20)			**Anus (C21)**		
	1996	**2001**	**2006**	**1996**	**2001**	**2006**
Total number of patients	193	203	249	12	10	14
Exclusions – DCO*	0	0	0	0	0	0
Exclusions – Insufficient information	6	0	3	0	0	1
Total exclusions	6	0	3	0	0	1
Total Reported on (% of all patients)	187 (97%)	203 (100%)	246 (99%)	12 (100%)	10 (100%)	13 (93%)
Total Reported on – Male (%)	108 (58%)	121 (60%)	148 (60%)	4 (33%)	5 (50%)	1 (8%)
Total Reported on – Female (%)	79 (42%)	82 (40%)	98 (40%)	8 (67%)	5 (50%)	12 (92%)
Average age at diagnosis – Male	67	67	68	63	70	-
Average age at diagnosis – Female	70	70	72	69	65	64

**DCO, Death Certificate Only – Patients whose only record of cancer was on their death certificate*

All cases combined	Number of patients		
	1996	2001	2006
Total number of patients	742	830	924
Exclusions – Death Certificate Only	1	1	0
Exclusions – Insufficient information	22	17	11
Total exclusions	23	18	11
Total Reported on (% of all patients)	719 (97%)	812 (98%)	913 (99%)
Total Reported on – Male (%)	380 (53%)	444 (55%)	495 (54%)
Total Reported on – Female (%)	339 (47%)	368 (45%)	418 (46%)
Average age at diagnosis – Male	68	68	69
Average age at diagnosis – Female	70	71	72

- The Registry identified 742 patients diagnosed with colorectal cancer in 1996, 830 in 2001 and 924 in 2006. Of the 924 colorectal patients in 2006, 590 had cancer of the colon, 71 had cancer of the RS junction, 249 had cancer of the rectum and 14 patients had cancer of the anus.
- After exclusions 719 remained in 1996, 812 in 2001, and 913 in 2006.
- Rectal cancers were more common in males than females (60:40).
- Colon cancers occurred with similar frequencies in both sexes.
- The average age at diagnosis was similar in males and females.

Socio-economic residential area of patients

Deprivation Quintile	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Quintile 1 (Least affluent)	158 (22%)	192 (24%)	179 (20%)
Quintile 2	162 (23%)	172 (21%)	195 (21%)
Quintile 3	164 (23%)	152 (19%)	189 (21%)
Quintile 4	129 (18%)	170 (21%)	180 (20%)
Quintile 5 (Most affluent)	106 (15%)	126 (15%)	170 (19%)

- The population of N.Ireland can be divided into five equally sized quintiles ranked by socio-economic deprivation level of residence. If a disease is not related to deprivation, it is expected that approximately 20% of all incidence would fall in each quintile. The data shows that in 2006 there was no significant difference in the levels of colorectal cancer by socio-economic groups. However in 1996 and 2001, there were significantly higher levels of colorectal cancer in the least affluent group.

Referral and presentation

Source of referral to specialist care

- In each year, at least 80% of colorectal cancer patients were referred by their GP.
- Similar patterns for referral for cancer of the colon, rectosigmoid junction and rectum referral were noted.
- There was no change in referral patterns with time.

Mode of presentation

Mode of presentation	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Outpatient	413 (57%)	422 (52%)	461 (51%)
Surgical admission via A&E	154 (21%)	179 (22%)	195 (21%)
Medical admission via A&E	62 (9%)	67 (8%)	135 (15%)
Screening	1 (<1%)	4 (<1%)	10 (1%)
Consultant Referral*	18 (3%)	46 (6%)	16 (2%)
Other**	43 (6%)	73 (9%)	88 (10%)
Not recorded	28 (4%)	21 (3%)	8 (<1%)
	Number of patients in 2006 (%)		
	All cases (n=913)	Colon & RS junction (n=654)	Rectum (n=246)
Outpatient	461 (51%)	289 (44%)	163 (66%)
Surgical admission via A&E	195 (21%)	169 (26%)	24 (10%)
Medical admission via A&E	135 (15%)	109 (17%)	26 (11%)
Screening	10 (1%)	5 (<1%)	5 (2%)
Consultant Referral*	16 (2%)	12 (2%)	4 (2%)
Other**	88 (10%)	68 (10%)	19 (8%)
Not recorded	8 (<1%)	2 (<1%)	5 (2%)

** A 'consultant referral' is a referral between consultants, where the initial consultant visit was not related to this cancer. ** 'Other' includes patients who presented as domiciliary visits or private patients.*

- In each year, more than half of colorectal cancer patients presented as outpatients.
- In 2006, two thirds of patients with cancer of the rectum presented as an outpatient.
- About one third of colorectal patients were admitted via A & E, with little change over the audit period. In 2006, 43% of patients with cancer of the colon & RS junction and 21% of patients with cancer of the rectum presented via A & E.
- Over the three audit years there has been an increase in the percentage of colorectal patients presenting as a medical admission via A & E, from 9% in 1996 to 15% in 2006 (P<0.001), with no change in the percentage presenting as a surgical admission (about 21%).
- There was a significantly higher proportion of patients with cancer of the colon and RS junction presenting as a surgical admission via A & E (26%) compared with patients with cancer of the rectum (10%).

Family history of colorectal and other cancers recorded in notes

Family history	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Colorectal cancer recorded	59 (8%)	102 (13%)	148 (16%)
Not recorded	507 (71%)	382 (47%)	246 (27%)
Other cancer recorded	40 (6%)	93 (12%)	180 (20%)
Not recorded	553 (77%)	428 (53%)	324 (36%)

- There was better recording of family history of colorectal and other cancers in 2006, with 16% having a recorded family history of colorectal cancer.

Genetic referral and screening recorded in notes

	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Genetic referral	3 (<1%)	15 (2%)	15 (2%)
Screening	20 (3%)	9 (1%)	76 (8%)

- In 2006, 2% of colorectal patients had a genetic referral recorded in their hospital notes, whilst 8% were recorded as being screened for colorectal cancer. There was no population based screening programme for bowel cancer in 2006, hence the patients picked up at screening are likely to have been on a surveillance programme due to increased risk.

Other bowel disease
(NOTE: Patients may have had more than one of these diseases)

Other bowel disease	Number of patients recorded (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Ulcerative colitis	2 (0.3%)	6 (0.7%)	8 (0.9%)
Colitis (non-infective)	2 (<1%)	2 (<1%)	4 (<1%)
Crohns disease	4 (<1%)	7 (<1%)	6 (<1%)
Familial adenomatous polyposis	0	7 (<1%)	5 (<1%)
Irritable bowel syndrome	4 (<1%)	8 (<1%)	2 (<1%)
Diverticular disease	39 (5%)	58 (7%)	126 (14%)
Other malignancy of any organ (excluding NMS*)	41 (6%)	68 (8%)	92 (10%)

**NMS = Non-melanoma skin*

- Although ulcerative colitis is a known risk factor for colon cancer, less than one percent of colorectal patients had a history of ulcerative colitis recorded in their hospital notes in each audit year.
- In 2006, more patients had a record of diverticular disease in their hospital notes (5% in 1996, 7% in 2001 and 14% in 2006). This pattern was consistent across all ages, although diverticular disease was, as expected more commonly recorded with increasing age. Of those colorectal patients diagnosed in 2006 recorded as having diverticular disease, 11% were aged below 55 years, 19% were between 55 and 64 years, 30% were aged between 65 and 74 years, whilst 40% were aged 75 years or older.
- For the other illnesses, there was little difference over the three audit years.

The figures for irritable bowel syndrome and diverticular disease appear to be underestimated compared to reported levels in a general population of about 15% for irritable bowel syndrome and about 40% for diverticular disease[16]. This may represent under-recording of this data in the notes of our study patients.

Symptoms

The symptoms of colorectal cancer vary according to the site. Cancers of the right side of the colon often present with symptoms such as anaemia, abdominal mass or intestinal obstruction. Cancers occurring in the left side of the colon generally cause a change in bowel habit, colicky abdominal pain and/or obstructive symptoms. Rectal cancers more often present with bleeding, change in bowel habit and/or rectal fullness and tenesmus (i.e. the sensation of incomplete rectal emptying).

Symptoms/signs at presentation for patients diagnosed in 2006 by cancer site
(NOTE: Patients may present with more than one symptom)

Symptom/ sign	Percentage of patients having the symptom recorded			
	All cases (n=913)	Colon & RS junction (n=654)	Rectum (n=246)	Anus (n=13)
Abdominal pain	53%	62%	32%	46%
Rectal bleeding	47%	34%	79%	77%
Altered bowel habit	43%	38%	60%	15%
Weight-loss	40%	41%	37%	39%
Anaemia	34%	40%	19%	0
Diarrhoea	32%	29%	42%	8%
Constipation	30%	32%	25%	46%
Lethargy	24%	27%	16%	15%
Tenesmus	14%	7%	33%	31%
Obstructed/perforated bowel	10%	12%	3%	0

- Symptoms recorded were generally similar in each year (not shown).
- In 2006, the most common presenting symptoms recorded for patients with cancer of the colon & RS junction was abdominal pain (62%). For patients with cancer of the rectum and cancer of the anus it was rectal bleeding (79% and 77% respectively).
- There was little change in the percentage of colon & RS junction patients experiencing a symptom for 6 months or more over the three audit years.
- In 2006, a third of rectal cancer patients who had experienced weight-loss did so for at least 6 months (26% in 1996).
- In 2006, fewer patients with rectal cancer experienced rectal bleeding for 6 months or more (21% compared with 26% in 1996, not statistically significant).

Hospital of presentation in 2006 by subtype

Hospital	Number of patients (% of total)		
	All cases (n=913)	Colon & RS junction(n=654)	Rectum (n=246)
Belfast City Hospital* (BCH)	61 (7%)	47 (7%)	13 (5%)
Royal Victoria Hospital* (RVH)	87 (10%)	63 (10%)	21 (9%)
Mater Infirmorum Hospital (MIH)	58 (6%)	43 (7%)	14 (6%)
TOTAL BELFAST TRUST	**206 (23%)**	**153 (23%)**	**48 (20%)**
The Ulster Hospital** (UH)	118 (13%)	82 (13%)	32 (13%)
Lagan Valley Hospital (LVH)	50 (6%)	40 (6%)	10 (4%)
Downe Hospital (DH)	26 (3%)	18 (3%)	8 (3%)
Ards Hospital*** (AR)	5 (<1%)	2 (<1%)	3 (1%)
TOTAL SOUTH-EASTERN TRUST	**199 (22%)**	**142 (22%)**	**53 (22%)**
TOTAL EHSSB	**405 (44%)**	**295 (45%)**	**101 (41%)**
Antrim Hospital** (ANT)	76 (8%)	52 (8%)	24 (10%)
Causeway (Coleraine) Hospital (COL)	59 (7%)	45 (7%)	14 (6%)
Whiteabbey Hospital (WHA)	48 (5%)	30 (5%)	18 (7%)
Mid-Ulster Hospital (MUH)	27 (3%)	24 (4%)	2 (<1%)
TOTAL NHSSB/NORTHERN TRUST	**210 (23%)**	**151 (23%)**	**58 (24%)**
Craigavon Area Hospital** (CAH)	79 (9%)	60 (9%)	19 (8%)
Daisy Hill Hospital (DHH)	56 (6%)	39 (6%)	16 (7%)
South Tyrone Hospital (STH)	5 (<1%)	3 (<1%)	2 (<1%)
Armagh Community Hospital (ACH)***	1 (<1%)	1 (<1%)	0
Banbridge Hospital (BBH)***	2 (<1%)	1 (<1%)	0
TOTAL SHSSB/SOUTHERN TRUST	**143 (16%)**	**104 (16%)**	**37 (17%)**
Altnagelvin Hospital** (AH)	79 (9%)	54 (8%)	25 (10%)
Erne Hospital (ERN)	33 (4%)	23 (4%)	9 (4%)
Tyrone County Hospital (TCH)	14 (2%)	11 (2%)	3 (1%)
TOTAL WHSSB/WESTERN TRUST	**126 (14%)**	**88 (13%)**	**37 (15%)**
Ulster Independent Clinic (UIC)	24 (3%)	13 (2%)	11 (5%)
North-West Independent Clinic (NWC)	1 (<1%)	1 (<1%)	0
TOTAL PRIVATE HOSPITALS	**25 (3%)**	**14 (2%)**	**11 (5%)**
NOT RECORDED	**4 (<1%)**	**2 (<1%)**	**2 (<1%)**

** Cancer Centre, ** Cancer Unit, *** Changed to community health facility with no inpatient facilities by 2001*

- The pattern of presentation at each of the hospitals was similar for each of the three audit years, with at least half of colorectal patients presenting to a cancer centre/unit.
- Colon and RS junction patients presented to 21 hospitals in 2006 whilst rectum patients presented to 18.
- The majority of patients presented to a hospital in their own Board of residence. This pattern changed little between 1996, 2001 and 2006.

Colorectal patients' ASA grading (American Society of Anesthesiologists grading) – an assessment for anaesthesia and surgery

ASA grading for colorectal patients who had surgery

ASA grading	Number of patients (% of surgery patients)		
All surgery patients	**1996 (n=637)**	**2001 (n=724)**	**2006 (n=728)**
I. A normally healthy individual	49 (8%)	99 (14%)	80 (11%)
II. A patient with mild systemic disease that does not limit activity	159 (25%)	189 (26%)	255 (35%)
III. A patient with severe systemic disease that limits activity but is not incapacitating	83 (13%)	133 (18%)	161 (22%)
IV. A patient with incapacitating systemic disease that is a constant threat to life.	14 (2%)	24 (3%)	26 (4%)
V. A moribund patient who is not expected to survive 24 hours with or without an operation	1 (<1%)	0	3 (<1%)
Not recorded	331 (52%)	279 (39%)	203 (28%)
Surgery patients who presented as a medical or surgical admission via A&E	**1996 (n=181)**	**2001 (n=209)**	**2006 (n=244)**
I. A normally healthy individual	12 (7%)	14 (7%)	16 (7%)
II. A patient with mild systemic disease that does not limit activity	45 (25%)	48 (23%)	69 (28%)
III. A patient with severe systemic disease that limits activity but is not incapacitating	30 (17%)	55 (26%)	61 (25%)
IV. A patient with incapacitating systemic disease that is a constant threat to life.	8 (4%)	16 (8%)	18 (7%)
V. A moribund patient who is not expected to survive 24 hours with or without an operation	1 (<1%)	0	3 (<1%)
Not recorded	85 (47%)	76 (36%)	77 (32%)

- Recording improved over the audit period. In 2006, 72% of colorectal patients had an ASA grade recorded (48% in 1996).
- In 2006, 11% of colorectal patients were graded as normally healthy (8% in 1996).
- ASA grading was similar for patients with cancer of the colon & RS junction and those with cancer of the rectum.
- Although 28% had no grade in 2006, only less than 1% of patients had a grade V.
- For patients presenting as an emergency admission the grading was similar in 2001 and 2006.

Investigations

Investigations recorded in notes
(NOTE: Patients may have had more than one type of investigation)

Investigation	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Barium enema	488 (68%)	489 (60%)	303 (33%)
Chest X-ray	451 (63%)	409 (50%)	613 (67%)
USS abdomen	399 (56%)	383 (47%)	306 (34%)
Sigmoidoscopy	375 (52%)	377 (46%)	425 (47%)
Abdominal X-ray	180 (25%)	194 (24%)	363 (40%)
Colonoscopy	168 (23%)	269 (33%)	437 (48%)
CT abdomen	130 (18%)	355 (44%)	839 (92%)
Barium meal	31 (4%)	10 (1%)	7 (<1%)
Endorectal USS (rectal patients only)	3 (2%)	22 (11%)	34 (14%)
MRI scan (rectal patients only)	1 (<1%)	9 (4%)	126 (51%)
PET scan	-	-	64 (7%)

- Between 2001 and 2006, there was little change in the percentage of colorectal cancer patients having had a sigmoidoscopy and barium meal.
- By 2006, significantly fewer colorectal cancer patients had a barium enema or an USS abdomen ($P<0.001$).
- By 2006, more patients with colorectal cancer had a CT of the abdomen, colonoscopy, abdominal X-ray and chest X-ray ($P<0.001$).
- In 2006, a higher percentage of patients with cancer of the rectum had an MRI scan (51% in 2006, <1% in 1996) and/ or endorectal USS (14% in 2006, 2% in 1996).
- In 2006, 7% of patients had a record in their notes of having had a PET scan.
- The patterns for each investigation between 1996 and 2006 were similar for patients age 79 years and under at diagnosis and those 80 years and over (not shown).

Investigations of colorectal cancer patients by health board of residence

Investigation	Health board	Number of patients (% of all patients within that Board)		
		1996	2001	2006
Sigmoidoscopy	NHSSB	106 (52%)	99 (49%)	121 (49%)
	EHSSB	141 (48%)	145 (45%)	151 (39%)
	SHSSB	58 (52%)	67 (49%)	92 (61%)
	WHSSB	70 (63%)	66 (44%)	61 (46%)
Barium enema	NHSSB	133 (66%)	121 (59%)	51 (21%)
	EHSSB	200 (69%)	200 (63%)	117 (31%)
	SHSSB	82 (73%)	94 (68%)	94 (62%)
	WHSSB	73 (65%)	74 (49%)	41 (31%)
Colonoscopy	NHSSB	54 (27%)	70 (34%)	136 (55%)
	EHSSB	63 (22%)	103 (32%)	194 (51%)
	SHSSB	29 (26%)	41 (30%)	38 (25%)
	WHSSB	22 (20%)	55 (37%)	69 (52%)
Endorectal USS (rectal patients only)	NHSSB	2 (4%)	0	1 (1%)
	EHSSB	0	1 (1%)	10 (10%)
	SHSSB	0	3 (9%)	1 (3%)
	WHSSB	1 (4%)	18 (44%)	22 (55%)

- In 2006, 61% of colorectal patients residing in the SHSSB had a sigmoidoscopy, which was higher rate than other Boards and an increase on previous years. For rectal patients residing the SHSSB, 87% had a sigmoidoscopy in 2006 (60% for those residing in the EHSSB).
- In 2006, 62% of colorectal patients residing in the SHSSB had a barium enema which was double that for patients residing in other Boards.
- In 2006, only a quarter of colorectal patients residing in the SHSSB had a colonoscopy, whilst for patients residing in other Boards the rate was over 50%.
- Endorectal USS was most commonly used in the WHSSB (55% in 2006, compared with 10% or less in the other Boards).

Histopathology and staging

Histopathological Type

- About 90% of colorectal cancer included in this study had a histological diagnosis, with the majority being adenocarcimonas.
- There was little change across the audit years.

Staging (see also Appendix E)

When stage was not recorded and there was sufficient information available in the clinical notes, Registry TVOs were able to assign a stage group (Registry-assigned stage). The AJCC staging classification[17] was applied.

TNM Stage (recorded in notes or Registry-assigned) for patients diagnosed 2006

Stage	Number of patients (%)					
	Colorectal		Colon & RS junction		Rectum	
	All patients (n=913)	Surgery patients (n=728)	All patients (n=654)	Surgery patients (n=536)	All patients (n=246)	Surgery patients (n=186)
Dukes A/ TNM I	92 (10%)	91 (13%)	51 (8%)	51 (10%)	41 (17%)	40 (22%)
Dukes B/ TNM IIA-IIB	249 (27%)	246 (34%)	194 (30%)	193 (36%)	52 (21%)	52 (28%)
Dukes C/ TNM IIIA-IIIC	236 (26%)	232 (32%)	170 (26%)	169 (32%)	64 (26%)	61 (33%)
Dukes D/ TNM IV	230 (25%)	121 (17%)	177 (27%)	102 (19%)	52 (21%)	18 (10%)
Staging not possible*	106 (12%)	38 (5%)	62 (9%)	21 (4%)	37 (15%)	15 (8%)

**Staging for these patients was not possible due to insufficient information in the notes*

- Overall approximately 10% of colorectal cancer was unstaged. For patients receiving surgery, approximately 5% were unstaged.
- The percentage of patients in each stage category was similar over the three years. This was also the case for patients undergoing surgery.

Nodal Assessment

The AJCC Cancer Staging Manual[17] recommends that 7-14 nodes are examined in a resection specimen. As the number of nodes examined for staging of colon cancers is itself a prognostic variable[18], the percentage of patients having no nodes examined, 1-10, 11-20 and more than 20 nodes were analysed. Unfortunately the information collected on nodes examined was recorded in the categories below and did not allow the category 7-14 nodes.

Number of lymph nodes examined

	Number of resection patients (%)					
	Colon & RS junction			Rectum		
Nodes	**1996 (n=431)**	**2001 (n=514)**	**2006 (n=494)**	**1996 (n=144)**	**2001 (n=147)**	**2006 (n=169)**
None	7 (2%)	10 (2%)	3 (<1%)	3 (2%)	7 (5%)	1 (<1%)
1-10	265 (62%)	201 (39%)	112 (23%)	69 (48%)	74 (50%)	53 (31%)
11-20	96 (22%)	223 (43%)	270 (55%)	43 (30%)	57 (39%)	85 (50%)
More than 20	6 (1%)	64 (13%)	100 (20%)	1 (<1%)	6 (4%)	25 (15%)
Not Recorded	57 (13%)	16 (3%)	9 (2%)	28 (19%)	3 (2%)	5 (3%)

- By 2006, 75% of resection patients with cancer of the colon & RS junction and 65% of resection patients with cancer of the rectum had 11 nodes or more examined, an improvement on 1996 and 2001.

Multidisciplinary Team Meetings

The effective management of colorectal cancer patients requires input from a range of experts. Multidisciplinary team meetings (MDTs) involve a group of healthcare professionals meeting to discuss the diagnosis and treatment of patients. The NICE guidelines[5] state: "The management of patients with colorectal cancer should be the responsibility of colorectal cancer MDTs." As there are a range of potential treatments that could be carried out, multidisciplinary discussions are of great importance. With respect to MDTs it should be noted that discussions among healthcare professionals, regarding the diagnosis and treatment of patients, may have taken place but may not have been recorded in the patient notes.

As there were only two patients in 1996 with a record of an MDT having taken place, the tables contain data for 2001 and 2006 only.

Multidisciplinary team meetings recorded in the notes by Board of residence

Area of residence	Number of patients (%)					
	Colorectal		Colon & RS junction		Rectum	
	2001	2006	2001	2006	2001	2006
NHSSB	13 (6%)	52 (21%)	9 (6%)	28 (16%)	4 (10%)	23 (33%)
EHSSB	64 (20%)	242 (63%)	36 (16%)	166 (60%)	26 (30%)	70 (71%)
SHSSB	2 (1%)	132 (87%)	1 (1%)	96 (87%)	1 (3%)	34 (90%)
WHSSB	92 (61%)	122 (92%)	61 (56%)	84 (92%)	31 (76%)	38 (95%)
N.Ireland	171 (21%)	548 (60%)	107 (18%)	374 (57%)	62 (31%)	165 (67%)

- Recording in the clinical notes that discussion at a MDT had taken place improved from 21% all patients in 2001 to 60% in 2006.
- There was a significant increase in recording in the clinical notes that discussion at a MDT had taken place across the audit period for each of the Boards (P<0.001).
- In the WHSSB more than 90% of patients in 2006 had a record in the clinical notes that discussion at a MDT had taken place.
- In 2006, the NHSSB had the lowest record in the clinical notes that discussion at a MDT had taken place, with 21% of patients residing in the NHSSB having a record of an MDT taking place (92% in WHSSB).
- A higher proportion of patients with cancer of the rectum had a record of MDT than patients with cancer of the colon & RS junction. This was the case in each Health Board.
- The increased recording in 2006 of MDT was noted across each stage and age group.

Multidisciplinary team meetings recorded in the notes of surgery patients by Board of residence and Board of surgery

Board of residence	Number of patients having a MDT recorded in their notes (% all surgery patients resigning in that Board)					
	Colorectal		Colon & RS junction		Rectum	
	2001	2006	2001	2006	2001	2006
NHSSB	12 (7%)	44 (23%)	9 (6%)	25 (18%)	3 (9%)	18 (35%)
EHSSB	58 (21%)	210 (70%)	35 (17%)	146 (67%)	21 (30%)	62 (77%)
SHSSB	2 (2%)	118 (92%)	1 (1%)	89 (90%)	1 (3%)	27 (100%)
WHSSB	87 (66%)	97 (93%)	58 (60%)	72 (94%)	29 (83%)	25 (93%)
N.Ireland	159 (22%)	469 (64%)	103 (19%)	332 (62%)	54 (32%)	132 (71%)
Board of surgery	**Number of surgery patients having a MDT recorded in their notes (% all patients whose surgery was performed in that Board)**					
	Colorectal		Colon & RS junction		Rectum	
	2001	2006	2001	2006	2001	2006
NHSSB	5 (3%)	15 (10%)	5 (4%)	10 (8%)	0	5 (15%)
EHSSB	69 (22%)	244 (70%)	41 (18%)	164 (67%)	26 (35%)	77 (77%)
SHSSB	1 (<1%)	113 (94%)	1 (1%)	84 (93%)	0	27 (96%)
WHSSB	83 (65%)	95 (94%)	56 (59%)	72 (96%)	27 (82%)	23 (100%)
N.Ireland	159 (22%)	469 (64%)	103 (19%)	332 (62%)	54 (32%)	132 (71%)

- MDTs were more likely in surgery patients. This pattern was similar for patients with cancer of colon, RS junction or rectum.
- Less than a quarter of surgery patients residing in the NHSSB had an MDT record in their notes.
- Only 10% of patients having surgery in the NHSSB had a record of MDT in their notes (94% in WHSSB).
- A higher proportion of surgery patients with cancer of the rectum had a record of MDT than patients with cancer of the colon & RS junction. This was the case in each Health Board.
- The increase in recording of an MDT in 2006, was noted across each of the age-groups. In 2006, at least 60% of patients aged 74 years and younger at diagnosis had a MDT recorded in their clinical notes compared with 56% of patients aged 75 years and older.
- In 2006, 9% of colorectal patients who had an MDT recorded in their notes had no stage recorded/ assigned.

- A higher proportion of cancer of the rectum patients with a record of MDT were unstaged compared with patients with cancer of the colon & RS junction (in 2006, 12% and 6% respectively). This was the case in each Health Board.

Treatment plan recorded in the notes by Board of residence

Area of residence	Number of patients having a treatment plan recorded in their notes (% all patients in that area of residence					
	Colorectal		Colon & RS junction		Rectum	
	2001	2006	2001	2006	2001	2006
NHSSB	50 (25%)	51 (21%)	41 (25%)	26 (15%)	8 (20%)	24 (34%)
EHSSB	102 (32%)	226 (59%)	66 (29%)	156 (56%)	35 (41%)	64 (65%)
SHSSB	39 (28%)	131 (87%)	31 (31%)	96 (87%)	8 (23%)	33 (87%)
WHSSB	89 (59%)	122 (92%)	62 (57%)	84 (92%)	27 (66%)	38 (95%)
N.Ireland	280 (35%)	530 (58%)	200 (33%)	362 (55%)	78 (38%)	159 (65%)

- In 2006, the majority of colorectal cancer patients residing in the SHSSB (87%) and WHSSB (92%) had a record of a treatment plan in their notes (only 21% of patients in the NHSSB).
- In 2006, 11% of patients having surgery in the NHSSB had a treatment plan recorded in their notes (65% in EHSSB, 94% in SHSSB and 97% in the WHSSB, not shown).

Surgery and oncology

Surgical procedures

- For colon & RS junction cancer: In 2006, 536 surgical procedures were carried out in 14 hospitals, (547 procedures in 17 hospitals in 2001).
- For rectal cancers: In 2006, 186 surgical procedures were carried out in 13 hospitals, (171 procedures in 15 hospitals in 2001).
- By 2006, 63% of colon & RS junction cancer surgery and 74% rectal cancer surgery was performed in the Cancer Centre or Cancer Units (64% and 67% respectively in 2001).
- Excluding emergency admissions:
  - For colon & RS junction cancer: In 2006, 321 surgical procedures were carried out in 13 hospitals, (358 procedures in 17 hospitals in 2001).
  - For rectal cancers: In 2006, 157 surgical procedures were carried out in 13 hospitals, (152 procedures in 15 hospitals in 2001).
  - By 2006, 61% of colon & RS junction cancer surgery and 73% rectal cancer surgery was performed in the Cancer Centre or Cancer Units (61% and 66% respectively in 2001).
  - Emergency admissions did not affect the number of hospitals providing surgery.
- For residents in the WHSSB there was a shift in hospital of operation from Tyrone County Hospital to the Erne Hospital by 2006.
- The majority of patients were operated on within their own Board of residence in each of the Audit years. However in 2006, 17% of patients with cancer of the colon & RS junction residing in the NHSSB who underwent surgery, had their surgery performed in the EHSSB. In 2006, one third of rectal cancer patients in the NHSSB who underwent surgery had their surgery performed in the EHSSB.

Hospital of surgery in 2006 by subtype

Hospital	Number of surgery patients (%)		
	Colorectal (n=728)	Colon & RS junction (n=536)	Rectum (n=186)
Belfast City Hospital* (BCH)	63 (9%)	48 (10%)	14 (8%)
Royal Victoria Hospital* (RVH)	112 (15%)	74 (14%)	36 (19%)
Mater Infirmorum Hospital (MIH)	41 (6%)	29 (5%)	11 (6%)
TOTAL BELFAST TRUST	**216 (30%)**	**151 (28%)**	**61 (33%)**
The Ulster Hospital** (UH)	91 (12%)	59 (11%)	32 (17%)
Lagan Valley Hospital (LVH)	40 (6%)	33 (6%)	7 (4%)
TOTAL SOUTH-EASTERN TRUST	**131 (18%)**	**92 (17%)**	**39 (21%)**
TOTAL EHSSB	**347 (48%)**	**243 (45%)**	**100 (54%)**
Antrim Hospital** (ANT)	60 (8%)	47 (9%)	13 (7%)
Causeway (Coleraine) Hospital (COL)	43 (6%)	36 (7%)	7 (4%)
Whiteabbey Hospital (WHA)	33 (5%)	21 (4%)	12 (6%)
Mid-Ulster Hospital (MUH)	17 (2%)	16 (3%)	1 (<1%)
TOTAL NHSSB/NORTHERN TRUST	**153 (21%)**	**120 (22%)**	**33 (18%)**
Craigavon Area Hospital** (CAH)	84 (11%)	61 (11%)	21 (11%)
Daisy Hill Hospital (DHH)	36 (5%)	29 (5%)	7 (4%)
TOTAL SHSSB/SOUTHERN TRUST	**120 (16%)**	**90 (17%)**	**28 (15%)**
Altnagelvin Hospital** (AH)	71 (10%)	49 (9%)	22 (12%)
Erne Hospital (ERN)	26 (4%)	25 (5%)	1 (<1%)
Tyrone County Hospital (TCH)	1 (<1%)	1 (<1%)	0
TOTAL WHSSB/WESTERN TRUST	**98 (13%)**	**75 (14%)**	**23 (12%)**
NOT RECORDED	**10 (1%)**	**8 (1%)**	**2 (1%)**

** Cancer Centre, ** Cancer Unit,*

Surgery

Patients had three main types of surgery (resection, stoma formation, and open and closed procedures). Resection includes abdomino-perineal resection (APER), anterior resection, right hemicolectomy, left hemicolectomy, excision of the sigmoid colon and excision of the transverse colon. There were three main types of stoma formation – colostomy, caecostomy and ileostomy. Colostomy can be a temporary or permanent procedure. Open and closed surgery was not specified in detail and was simply recorded as "yes" or "no".

Surgery (Note: A patient may have received more than one type of surgery)

Site	Surgery	Number of patients (%)		
		1996 (n=719)	**2001 (n=812)**	**2006 (n=913)**
Colorectal	Resection only	452 (63%)	460 (57%)	444 (49%)
	Resection with stoma	128 (18%)	204 (25%)	222 (24%)
	Stoma formation only	13 (2%)	20 (2%)	8 (<1%)
	Open and close	3 (<1%)	2 (<1%)	0 (<1%)
	Other surgery*	51 (7%)	63 (8%)	75 (8%)
	No surgery	82 (11%)	88 (11%)	185 (20%)
		1996 (n=520)	**2001 (n=599)**	**2006 (n=654)**
Colon & RS junction	Resection only	385 (74%)	417 (70%)	399 (61%)
	Resection with stoma	46 (9%)	97 (16%)	95 (15%)
	Stoma formation only	7 (1%)	7 (1%)	3 (<1%)
	Open and close	3 (<1%)	2 (<1%)	0
	Other surgery*	32 (6%)	44 (7%)	54 (8%)
	No surgery	57 (11%)	52 (9%)	118 (18%)
		1996 (n=187)	**2001 (n=203)**	**2006 (n=246)**
Rectum	Resection only	67 (36%)	42 (21%)	44 (18%)
	Resection with stoma	77 (41%)	105 (52%)	125 (51%)
	Stoma formation only	5 (3%)	11 (5%)	3 (1%)
	Open and close	0	0	0
	Other surgery*	18 (10%)	17 (8%)	20 (8%)
	No surgery	20 (11%)	32 (16%)	20 (8%)

**Includes gynae operations at which cancer was discovered. Note: Stoma may be temporary or permanent.*

- There were no open and closed operations in 2006, indicating better pre-op diagnosis using scans etc.
- The proportion of patients having a resection (with or without a stoma) decreased (P<0.001) (81% in 1996, 82% in 2001, 73% in 2006).
- There were increased numbers of patients having a stoma (P<0.001).
- In 2006, more than half of patients with cancer of the rectum had a resection with stoma formation performed (15% of patients with cancer of the colon & RS junction).

Large bowel surgery

Site	Surgery	Number of patients (%)		
		1996 (n=719)	**2001 (n=812)**	**2006 (n=913)**
Colorectal	Abdomino-perineal resection	60 (8%)	56 (7%)	58 (6%)
	Anterior resection	132 (18%)	177 (22%)	166 (18%)
	Right hemicolectomy	209 (29%)	212 (26%)	259 (21%)
	Left hemicolectomy	54 (8%)	72 (9%)	69 (8%)
	Sigmoid colectomy	85 (12%)	104 (12%)	67 (7%)
	Transverse colectomy	9 (1%)	12 (1%)	5 (<1%)
	Other*	72 (10%)	69 (8%)	96 (11%)
		1996 (n=520)	**2001 (n=599)**	**2006 (n=654)**
Colon & RS junction	Abdomino-perineal resection	3 (<1%)	11 (2%)	1 (<1%)
	Anterior resection	54 (10%)	80 (13%)	65 (10%)
	Right hemicolectomy	209 (40%)	212 (35%)	259 (40%)
	Left hemicolectomy	51 (10%)	72 (12%)	66 (10%)
	Sigmoid colectomy	82 (16%)	102 (17%)	67 (10%)
	Transverse colectomy	9 (2%)	12 (2%)	5 (<1%)
	Other*	45 (9%)	49 (8%)	70 (11%)
		1996 (n=187)	**2001 (n=203)**	**2006 (n=246)**
Rectum	Abdomino-perineal resection	52 (28%)	43 (21%)	55 (22%)
	Anterior resection	78 (42%)	97 (48%)	100 (41%)
	Left hemicolectomy	3 (2%)	0	3 (1%)
	Sigmoid colectomy	3 (2%)	2 (1%)	0
	Other*	26 (14%)	18 (8%)	25 (10%)

** Other includes colectomy, endoscopic excision, rectosigmoidectomy, Hartmann's, bypass procedures and other procedures not specified.*

- For patients with cancer of the colon & RS junction, right hemicolectomy was the most frequent resection performed in 1996, 2001 and 2006.
- Anterior resection was the most frequent resection performed across the period for patients with cancer of the rectum.
- In 2006, fewer patients with cancer of the colon & RS junction had a sigmoid colectomy performed (10% in 2006, 16% in 1996).

Anastomotic leak in colorectal cancer patients having a resection

Surgical procedure	Anastomotic leak	Number of patients (% of patients)		
		1996 (n=580)	**2001 (n=664)**	**2006 (n=666)**
All resections	Yes	18 (3%)	28 (4%)	42 (6%)
	No	490 (85%)	612 (92%)	587 (88%)
	Not recorded	72 (12%)	24 (4%)	57 (6%)
		1996 (n=132)	**2001 (n=177)**	**2006 (n=166)**
Anterior resection	Yes	4 (3%)	11 (6%)	16 (10%)
	No	119 (90%)	163 (92%)	144 (87%)
	Not recorded	9 (7%)	3 (2%)	6 (4%)
		1996 (n=448)	**2001 (n=487)**	**2006 (n=500)**
Other resections	Yes	14 (3%)	17 (3%)	26 (5%)
	No	371 (83%)	449 (92%)	443 (89%)
	Not recorded	63 (14%)	21 (4%)	31 (6%)

- In 2006, 10% of colorectal patients who had an anterior resection were recorded as having an anastomotic leak (guidelines[3] suggest a maximum rate of 8%). For the remaining resections, the rate was 5% in 2006 (guidelines[3] suggest a maximum rate of 4%).

Total mesenteric excision (TME) confirmed in operative specimen

TME involves careful dissection of the node-bearing mesorectum, and it is recommended for tumours in the lower two thirds of the rectum. Patients who have had TME have been shown to have lower recurrence rates than non-TME patients[19].

Total mesenteric excision (TME)

TME confirmed in notes	Number of resection patients (%) Rectum			Number of resection patients (%) RS junction		
	1996 (n=144)	2001 (n=147)	2006 (n=169)	1996 (n=34)	2001 (n=84)	2006 (n=53)
Yes	27 (19%)	30 (20%)	108 (64%)	2 (6%)	14 (17%)	22 (42%)
No	18 (13%)	38 (26%)	16 (9%)	6 (18%)	28 (33%)	3 (6%)
Not recorded	99 (69%)	79 (54%)	45 (27%)	26 (77%)	42 (50%)	28 (53%)

- In 2006, there was a significant increase ($P<0.001$) in the recording of TME being performed for patients with cancer of the rectum and cancer of the RS junction (64% and 42% respectively in 2006).
- The improvement in recording was noted for each hospital.

Number of resections performed by surgeons in 2006

Resections per surgeon	Number of surgeons (% of resections)		
	Colorectal (n=666)	Colon & RS junction (n=494)	Rectum (n=169)
20 or more resections	10 (41%)	3 (16%)	0
10 – 19 resections	13 (27%)	13 (34%)	3 (27%)
5 – 9 resections	18 (17%)	21 (27%)	14 (54%)
2 – 4 resections	29 (11%)	28 (16%)	8 (13%)
Single operators	25 (4%)	30 (6%)	9 (5%)
Total resections	666	494	169
Total operators	95	95	34
Total consultants	75	75	31
Total surgeons in training	20	20	3

- In 2006, 41% of patients with colorectal cancer had their surgery performed by someone who undertook at least 20 resections that year.
- In 2006, 15% of colorectal patients had their resection performed by a surgeon undertaking less than 5 of these procedures.
- In 2006, of those patients with cancer of the colon and RS junction undergoing surgery, half had their resection carried out by a surgeon undertaking at least 10 of these procedures annually.
- In 2006, of those patients with cancer of the rectum undergoing surgery, 27% had their resection carried out by a surgeon undertaking at least 10 of these procedures annually.
- In 2006, 4% of patients with colorectal cancer had their resection performed by a surgeon who undertook only one such procedure in that year.
- In 2006, 95 operators were involved in resections for 494 colon & RS junction cancers, 34 operators for 169 rectal cancers.

Number of resections performed by grade of operator in 2006

Operator grade	Number of resections (% of total resections)		
	Colorectal (n=666)	Colon & RS junction (n=494)	Rectum (n=169)
Consultant surgeons	619 (93%)	451 (91%)	165 (98%)
Surgeon in training	46 (7%)	42 (9%)	4 (2%)
Not recorded	1 (<1%)	1 (<1%)	0

- By 2006, 91% of colon & RS junction cancer patients and 98% of rectal cancer patients had their resection performed by a consultant surgeon.

Oncology treatment for colorectal cancer

Treatment	Number of patients (%)					
	Any Chemotherapy			Any Radiotherapy		
Colorectal	**1996 (n=719)**	**2001 (n=812)**	**2006 (n=913)**	**1996 (n=719)**	**2001 (n=812)**	**2006 (n=913)**
Yes	176 (24%)	232 (29%)	279 (31%)	72 (10%)	99 (12%)	151 (17%)
No	336 (47%)	546 (67%)	634 (69%)	310 (43%)	685 (84%)	762 (84%)
Not recorded	207 (29%)	34 (4%)	0	337 (47%)	28 (3%)	0
Colon & RS junction	**1996 (n=520)**	**2001 (n=599)**	**2006 (n=654)**	**1996 (n=520)**	**2001 (n=599)**	**2006 (n=654)**
Yes	131 (25%)	165 (28%)	191 (29%)	11 (2%)	23 (4%)	27 (4%)
No	241 (46%)	407 (68%)	463 (69%)	245 (47%)	557 (93%)	627 (96%)
Not recorded	148 (29%)	27 (5%)	0	264 (5%)	19 (3%)	0
Rectum	**1996 (n=187)**	**2001 (n=203)**	**2006 (n=246)**	**1996 (n=187)**	**2001 (n=203)**	**2006 (n=246)**
Yes	39 (21%)	64 (32%)	79 (32%)	45 (24%)	68 (33%)	116 (47%)
No	90 (48%)	133 (66%)	167 (68%)	64 (34%)	127 (63%)	130 (53%)
Not recorded	58 (31%)	6 (3%)	0	78 (42%)	8 (4%)	0

- Recording of treatment had improved by 2006.
- By 2006, there were more colorectal patients receiving chemotherapy than in previous years (P<0.001) and radiotherapy (P<0.001) (31% and 17% respectively in 2006).
- For patients with cancer of the colon & RS junction, the percentages of patients in 2001 and 2006 who received chemotherapy were similar, but higher than that of 1996.
- In 2001 and 2006, 4% of patients with cancer of the colon & RS junction received radiotherapy compared with 2% in 1996.
- Of those patients with cancer of the colon who received radiotherapy, it was either adjuvant or it was given to patients with metastatic disease.
- For patients with cancer of the rectum 32% received chemotherapy, an increase on 1996 (21%).
- By 2006 almost half of cancer of the rectum patients received radiotherapy, compared with about a quarter in 1996.

Chemotherapy

Neo-adjuvant chemotherapy refers to a preliminary cancer treatment that precedes a necessary second modality of treatment e.g. pre-operative chemotherapy. Adjuvant chemotherapy refers to a cancer treatment following another treatment type e.g. post-operative chemotherapy.

Site	Therapy	Number of patients (%)		
		1996 (n=176)	**2001 (n=232)**	**2006 (n=279)**
Colorectal	Adjuvant	150 (85%)	209 (90%)	232 (83%)
	Neo-adjuvant	6 (3%)	7 (3%)	15 (5%)
	Other/ Not recorded	20 (11%)	16 (7%)	32 (12%)
		1996 (n=131)	**2001 (n=165)**	**2006 (n=191)**
Colon & RS junction	Adjuvant	114 (87%)	155 (94%)	178 (93%)
	Neo-adjuvant	5 (4%)	0	0
	Other/ Not recorded	12 (9%)	10 (6%)	13 (7%)
		1996 (n=39)	**2001 (n=64)**	**2006 (n=79)**
Rectum	Adjuvant	34 (87%)	53 (83%)	51 (65%)
	Neo-adjuvant	1 (3%)	7 (11%)	14 (18%)
	Other/ Not recorded	4 (10%)	4 (6%)	14 (18%)

- In each of the years, more than 80% of patients receiving chemotherapy were recorded as adjuvant, i.e. following another treatment, usually surgery.
- The Guidelines for the Management of Colorectal Cancer issued by ACGBI[3], state that patients with Dukes C colon cancer should be considered for adjuvant chemotherapy. In 2006, 60% of Dukes C colon cancer had adjuvant chemotherapy (34% in 1996), (not shown).

Treatment modalities as recorded in notes

Chemotherapy, radiotherapy & surgery combined treatment modalities for patients as recorded in notes

Treatment	Number of patients (%)					
	Colon & RS junction			Rectum		
	1996 (n=520)	2001 (n=599)	2006 (n=654)	1996 (n=187)	2001 (n=203)	2006 (n=246)
Surgery alone	332 (64%)	377 (63%)	352 (54%)	105 (56%)	82 (40%)	68 (28%)
Chemotherapy alone	5 (1%)	5 (<1%)	13 (2%)	1 (<1%)	2 (1%)	5 (2%)
Radiotherapy alone	0	2 (<1%)	4 (<1%)	4 (2%)	4 (2%)	9 (4%)
Surgery plus chemotherapy	117 (23%)	149 (25%)	161 (25%)	16 (9%)	27 (13%)	20 (8%)
Surgery plus radiotherapy	5 (1%)	10 (2%)	6 (<1%)	25 (13%)	29 (14%)	53 (22%)
Chemotherapy plus radiotherapy	0	0	0	1 (<1%)	2 (1%)	9 (4%)
Surgery plus chemotherapy plus radiotherapy	9 (2%)	11 (2%)	17 (3%)	21 (11%)	33 (16%)	45 (18%)
No treatment	52 (10%)	45 (8%)	101 (15%)	14 (8%)	24 (12%)	37 (15%)

- In 2006, fewer patients received surgery as their only form of treatment (P<0.001). This was more marked for patients with cancer of the rectum (56% in 1996, 40% in 2001 and 28% in 2006).
- There was an increase in the number of patients with cancer of the rectum having radiotherapy over the study period, whether as the sole treatment or as a combination with surgery and chemotherapy. For example, the percentage of patients with cancer of the rectum receiving surgery and radiotherapy as a treatment combination increased from 13% in 1996 to 22% in 2006 (P<0.05).
- There was a significant increase (P<0.001) in the number of patients who did not have any form of treatment recorded in their hospital notes.

Patients who had no active treatment recorded
(Note: Categories are not mutually exclusive)

Patient factors	Number of patients (% of patients with no active treatment)		
	1996 (n=67)	2001 (n=69)	2006 (n=140)
Less than 80 years at diagnosis	43 (64%)	36 (52%)	97 (42%)
Aged 80 years or greater at diagnosis	24 (36%)	33 (48%)	43 (58%)
Dukes A	6 (9%)	4 (4%)	1 (<1%)
Dukes D	32 (48%)	35 (51%)	75 (54%)
Died within 4 weeks of diagnosis	30 (47%)	22 (33%)	37 (29%)

- In 2006, of those patients who had no record of treatment in their notes more than half were Dukes D, almost 60% were aged over 80 years at diagnosis and 29% died within 4 weeks of diagnosis.
- The Dukes A patient in 2006 did not wish to have surgery or palliative treatment.

Timelines in the patient pathway

Summary timeline for colorectal patients

Duration (Days)	Number of patients (%)					
	Referral to first seen at hospital			First seen at hospital to diagnosis		
	1996 n=719	2001 n=812	2006 n=913	1996 n=719	2001 n=812	2006 n=913
Not recorded	96 (13%)	34 (4%)	38 (4%)	45 (7%)	14 (2%)	8 (1%)
	Number of patients (% of those with timeline recorded)					
	n=623	n=778	n=875	n=674	n=798	n=901
Day 1	256 (41%)	262 (34%)	352 (40%)	132 (20%)	39 (5%)	166 (18%)
Day 14	400 (64%)	419 (54%)	472 (54%)	354 (53%)	317 (40%)	443 (49%)
Day 31	514 (83%)	573 (74%)	611 (70%)	475 (70%)	489 (61%)	582 (65%)
Day 62	518 (93%)	694 (89%)	759 (87%)	580 (86%)	628 (79%)	421 (80%)
	Diagnosis to surgery			Diagnosis to surgery (excluding admissions via A & E and patients having neo-adjuvant treatment)		
	1996 n=637	2001 n=724	2006 n=728	1996 n=446	2001 n=465	2006 n=405
Not recorded	1 (<1%)	2 (<1%)	1 (<1%)	1 (<1%)	1 (<1%)	0
	Number of patients (% of those with timeline recorded)					
	n=636	n=722	n=727	n=445	n=464	n=405
Day 1	261 (41%)	415 (57%)	319 (44%)	163 (37%)	249 (54%)	142 (35%)
Day 14	514 (81%)	514 (71%)	391 (54%)	352 (79%)	324 (70%)	186 (46%)
Day 31	604 (95%)	636 (88%)	485 (67%)	424 (95%)	426 (92%)	260 (64%)
Day 62	620 (97%)	690 (96%)	608 (84%)	438 (98%)	452 (97%)	360 (89%)

Duration (Days)	Number of patients (%)					
	Suspected cancer patients' referral received at hospital to sigmoidoscopy			Suspected cancer patients' referral received at hospital CT scan		
	1996 n=375	2001 n=377	2006 n=425	1996 n=130	2001 n=355	2006 n=839
Not recorded	58 (15%)	15 (4%)	16 (4%)	23 (18%)	20 (6%)	47 (6%)
	Number of patients (% of those with timeline recorded)					
	n=317	n=362	n=409	n=107	n=335	n=792
Day 1	35 (11%)	10 (3%)	24 (6%)	10 (9%)	8 (2%)	29 (4%)
Day 14	146 (46%)	113 (31%)	132 (35%)	31 (29%)	76 (23%)	233 (29%)
Day 31	215 (68%)	185 (51%)	220 (51%)	58 (54%)	147 (44%)	339 (43%)
Day 62	275 (87%)	264 (73%)	306 (75%)	79 (74%)	228 (68%)	461 (58%)

- There was better recording of timelines in 2001 and 2006.
- The number of days between referral and first seen at hospital were similar over the period, with more than half of colorectal patients seen within two weeks.
- By 2006, almost half of colorectal patients had a diagnosis within two weeks of being first seen at hospital.
- In 2006 time to surgery was longer, with 54% of colorectal patients having surgery within two weeks of diagnosis, (71% in 2001).
- For patients with cancer of the colon & RS junction, waiting times from diagnosis to surgery were longer with 87% of patients receiving their surgery within two weeks of being diagnosed in 1996, compared with 65% in 2006. Excluding patients who presented via A & E, and those who had neo-adjuvant treatment, 86% of patients in 1996 had their surgery within two weeks of diagnosis, whilst in 2006 it was 47%.
- For patients with cancer of the rectum, waiting times from diagnosis to surgery were longer with 62% of patients receiving their surgery within two weeks of being diagnosed in 1996, compared with 24% in 2006. Excluding patients who presented via A & E, and those who had neo-adjuvant chemotherapy, 65% of patients in 1996 had their surgery within two weeks of diagnosis, whilst in 2006 it was 32%.
- Waiting times for patients receiving a sigmoidoscopy were similar in 2001 and 2006.
- In 1996 and 2006, 29% of patients had their CT within two weeks from the date they were first referred to hospital with a suspected cancer to having a CT abdomen. However, the volume of patients having a CT increased from 130 patients in 1996 to 839 patients in 2006, corresponding to 18% and 92% of patients diagnosed in 1996 and 2006 respectively.

Information and after care

Information recorded in notes

Information	Number of patients (% of all patients)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Diagnosis discussed with patient	349 (49%)	599 (74%)	828 (91%)
Diagnosis not discussed with patient	30 (4%)	33 (4%)	40 (4%)
Treatment plan discussed with patient	347 (48%)	572 (70%)	837 (92%)
Management discussed with oncologist	363 (51%)	570 (70%)	660 (72%)
Referred to oncology centre	298 (41%)	482 (59%)	548 (60%)
Seen by stoma therapist (for those patients recorded as having had a stoma)	87 (58%)	154 (65%)	233 (93%)
Psycho-social needs considered	289 (40%)	699 (86%)	865 (95%)
Written information given	7 (1%)	31 (4%)	272 (30%)
Clinical trial discussed with patient	121 (17%)	21 (3%)	13 (1%)
Clinical trial recorded in notes	100 (14%)	7 (<1%)	16 (2%)

- By 2006, over 90% of colorectal cancer patients had recorded in their notes that their diagnosis had been discussed with them, a significant improvement on 1996 and 2001 (P<0.001)
- In 2006, 72% of patients had their management discussed with an oncologist, whilst 60% were referred to an oncology centre, each of these were significant improvements on 1996 and 2001 (P<0.001).
- Many more patients in 2006 were seen by a stoma therapist, had their psycho-social needs considered and written information given (P<0.001).
- Of those patients who underwent a stoma formation 93% in 2006 were referred to a stoma therapist (65% in 2001 and 58% in 1996).

Follow-up care details

This relates to information recorded in the discharge letter from hospital to GP.

After care recorded (Note: patients may have had more than one type of referral).

After care	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
GP	48 (7%)	351 (43%)	376 (41%)
Community nurse	21 (3%)	183 (23%)	278 (30%)
Macmillan nurse	34 (5%)	78 (10%)	271 (30%)
Hospice	24 (3%)	26 (3%)	85 (9%)
Marie Curie nurse	15 (2%)	11 (1%)	19 (2%)
Palliative care specialist	21 (3%)	368 (45%)	178 (20%)
Psychologist referral	5 (<1%)	15 (2%)	19 (2%)
Info on support groups/education supplied	1 (<1%)	5 (<1%)	110 (12%)

- By 2006, significant improvements in referrals to GP, Community nurse, MacMillan nurse, and Hospice were noted (P<0.001).
- In 2006, significantly more patients were given information on support groups/ education (P<0.001, less than 1 % in 1996 and 2001, and 12% in 2006).
- There was little change in referral to Marie Curie nurses and psychologist over the period.

Information in GP letter

Information	Number of patients (%)		
	1996 (n=719)	2001 (n=812)	2006 (n=913)
Diagnosis discussed with patient	185 (26%)	420 (52%)	747 (82%)
Diagnosis not discussed with patient	64 (9%)	176 (22%)	61 (7%)
Diagnosis discussed with family	126 (18%)	224 (28%)	569 (62%)
Prognostic information	269 (37%)	675 (83%)	650 (71%)
Management plan	552 (77%)	730 (90%)	889 (97%)

- In 2006, over 80% of colorectal patients had in their letter to GP, a record of their diagnosis being discussed with them, a significant improvement on 1996 (26%) and 2001 (52%) (P<0.001).
- Overall, information to the GP greatly improved with over 97% having a management plan.

Patient survival

Survival analysis was performed on patients diagnosed in 1996, 2001 and 2006, with follow up for 2 years. Sub-group analysis was carried out for surgery and non-surgery patients, and for stage of disease.

Percentage of patients alive at various times after diagnosis

Site	Time	Observed survival (%)		
		1996 (n=719)	**2001 (n=812)**	**2006 (n=913)**
Colorectal	30 days	92%	92%	93%
	60 days	88%	89%	87%
	6 months	79%	79%	77%
	12 months	69%	73%	70%
	24 months	57%	61%	60%
		1996 (n=520)	**2001 (n=599)**	**2006 (n=654)**
Colon & RS junction	30 days	90%	91%	92%
	60 days	87%	88%	85%
	6 months	78%	78%	74%
	12 months	69%	72%	67%
	24 months	57%	60%	57%
		1996 (n=187)	**2001 (n=203)**	**2006 (n=246)**
Rectum	30 days	95%	96%	95%
	60 days	90%	91%	93%
	6 months	82%	81%	85%
	12 months	70%	75%	77%
	24 months	57%	61%	67%

- There was no significant improvement in survival rate for patients with cancer of the colon & RS junction (Figure 3).
- For rectum, the observed survival of all study patients in 2006 was significantly ($P<0.05$) higher than those in 1996; the 24-month observed survival of patients was 67% in 2006 and 57% in 1996 (Figure 4).

Figure 3: Colon & RS junction cancer observed survival by year of diagnosis

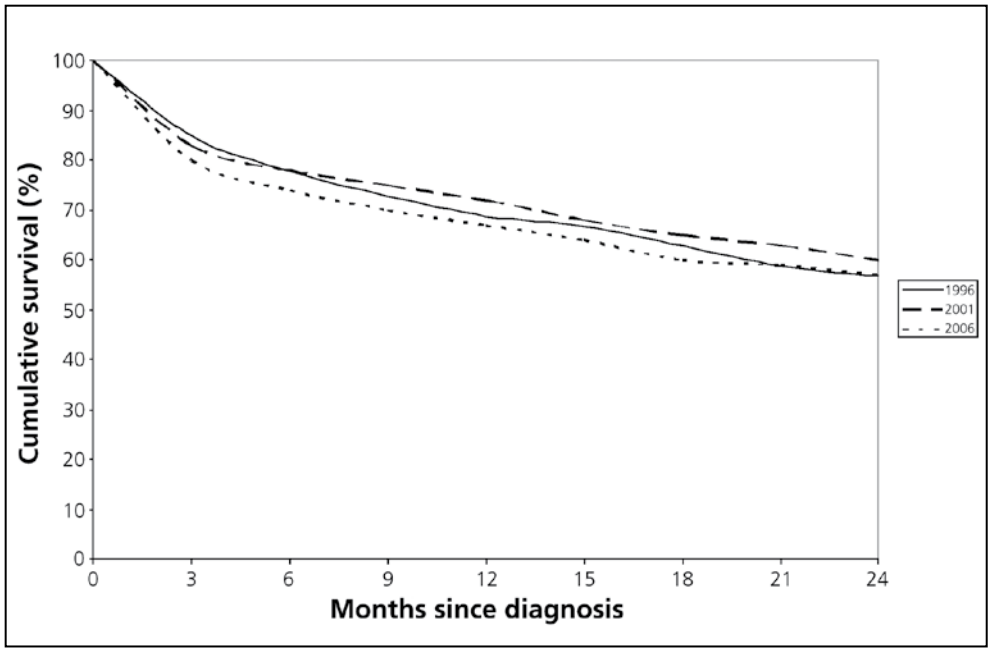
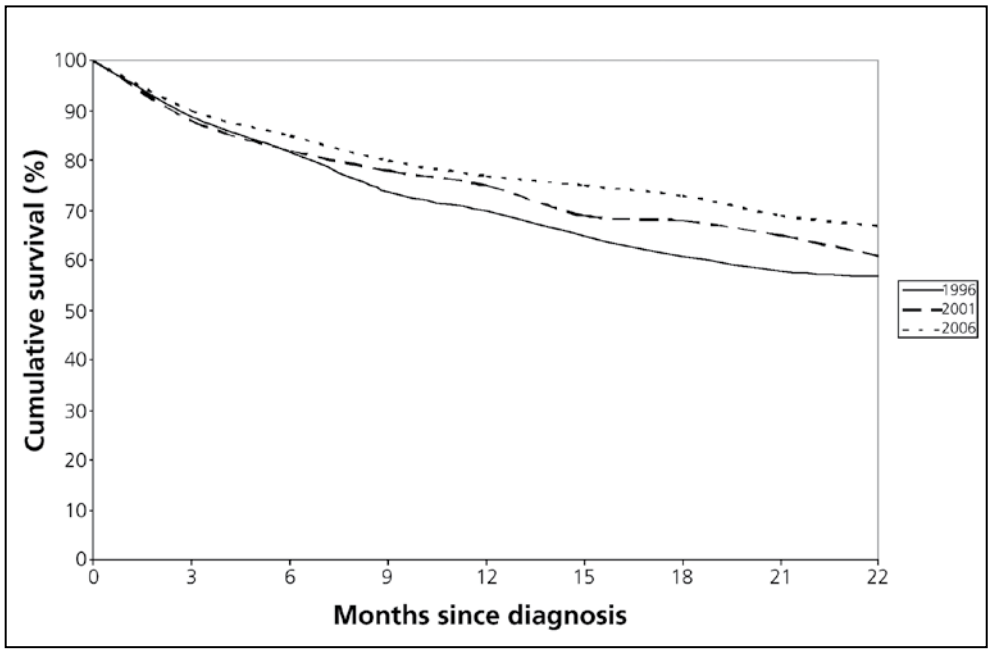


Figure 4: Rectum cancer observed survival by year of diagnosis

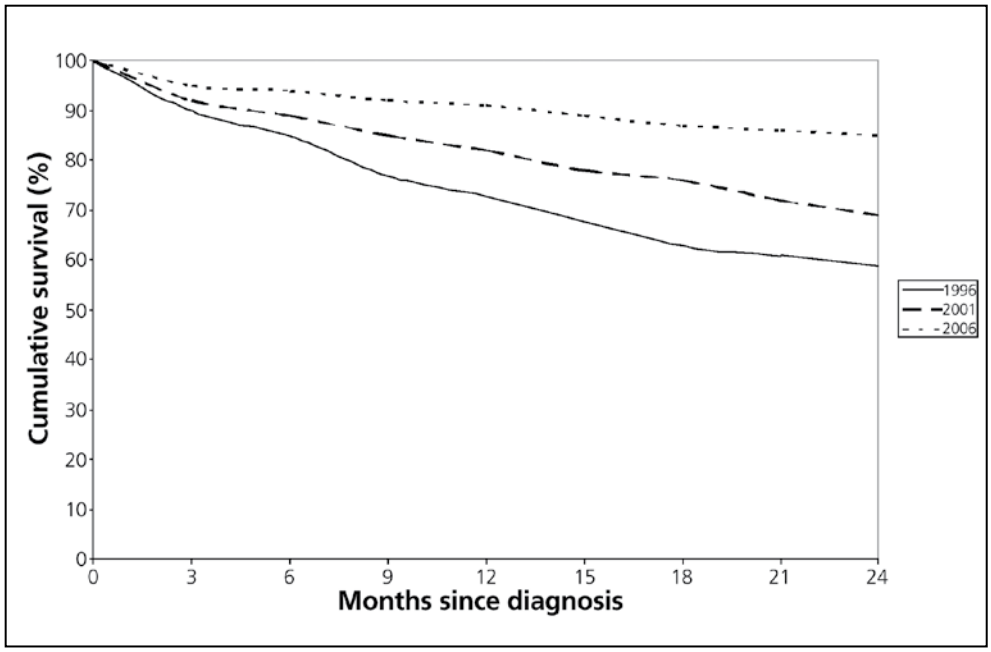


Percentage of surgery patients alive at various times after diagnosis

Site	Time	Observed survival (%)		
		1996 (n=637)	**2001 (n=724)**	**2006 (n=728)**
Colorectal	30 days	95%	95%	95%
	60 days	93%	92%	92%
	6 months	85%	85%	86%
	12 months	75%	79%	81%
	24 months	62%	66%	71%
		1996 (n=463)	**2001 (n=547)**	**2006 (n=536)**
Colon & RS junction	30 days	94%	94%	95%
	60 days	92%	91%	91%
	6 months	85%	83%	83%
	12 months	76%	77%	77%
	24 months	63%	65%	67%
		1996 (n=167)	**2001 (n=171)**	**2006 (n=1866)**
Rectum	30 days	9%	97%	97%
	60 days	93%	94%	97%
	6 months	85%	90%	94%
	12 months	73%	83%	91%
	24 months	60%	70%	84%

- For patients with cancer of the rectum who underwent surgery, the observed survival of surgery patients in 2006 was significantly higher than those in 1996 and 2001 ($P<0.001$); the 24-month observed survival of patients was 60% in 1996, 70% in 2001 and 84% in 2006 (Figure 5).
- There was no significant improvement in survival rate for patients with cancer of the colon & RS junction who underwent surgery.

Figure 5: Rectum cancer observed survival by year of diagnosis for surgery patients



Percentage of colorectal patients alive at various times after diagnosis by disease stage

Year	Time	Dukes A	Dukes B	Dukes C	Dukes D	Un-staged	All patients
All years	30 days	97%	97%	96%	87%	80%	**92%**
	60 days	96%	95%	94%	76%	71%	**88%**
	6 months	94%	93%	90%	51%	54%	**79%**
	12 months	92%	89%	84%	35%	44%	**71%**
	24 months	88%	83%	71%	15%	32%	**59%**
	Total patients	251	720	650	575	248	**2444**
1996	30 days	95%	97%	95%	85%	74%	**96%**
	60 days	95%	96%	94%	77%	63%	**92%**
	6 months	92%	94%	89%	48%	60%	**75%**
	12 months	91%	89%	81%	28%	44%	**56%**
	24 months	90%	80%	64%	13%	29%	**49%**
	Total patients	65	254	169	170	61	**719**
2001	30 days	98%	97%	96%	87%	75%	**96%**
	60 days	97%	96%	93%	79%	68%	**93%**
	6 months	93%	95%	87%	54%	49%	**78%**
	12 months	89%	92%	81%	43%	41%	**60%**
	24 months	85%	86%	69%	17%	29%	**52%**
	Total patients	94	217	245	175	81	**812**
2006	30 days	98%	96%	97%	86%	85%	**97%**
	60 days	97%	93%	95%	72%	77%	**93%**
	6 months	94%	90%	92%	49%	56%	**80%**
	12 months	93%	87%	88%	34%	44%	**61%**
	24 months	90%	82%	78%	15%	34%	**54%**
	Total patients	92	249	236	230	106	**913**

- As expected, there was a highly significant difference in the overall survival of patients by stage ($P<0.001$), with late Dukes D disease patients having the poorest overall survival, 15% at 24 months, compared with 88% for Dukes A patients. Similar survival by stage of disease patterns were noted for patients with cancer of colon & RS junction (Figure 6) and those with cancer of the rectum (Figure 7).

Figure 6: Observed survival by stage of disease for patients with cancer of the colon & RS junction

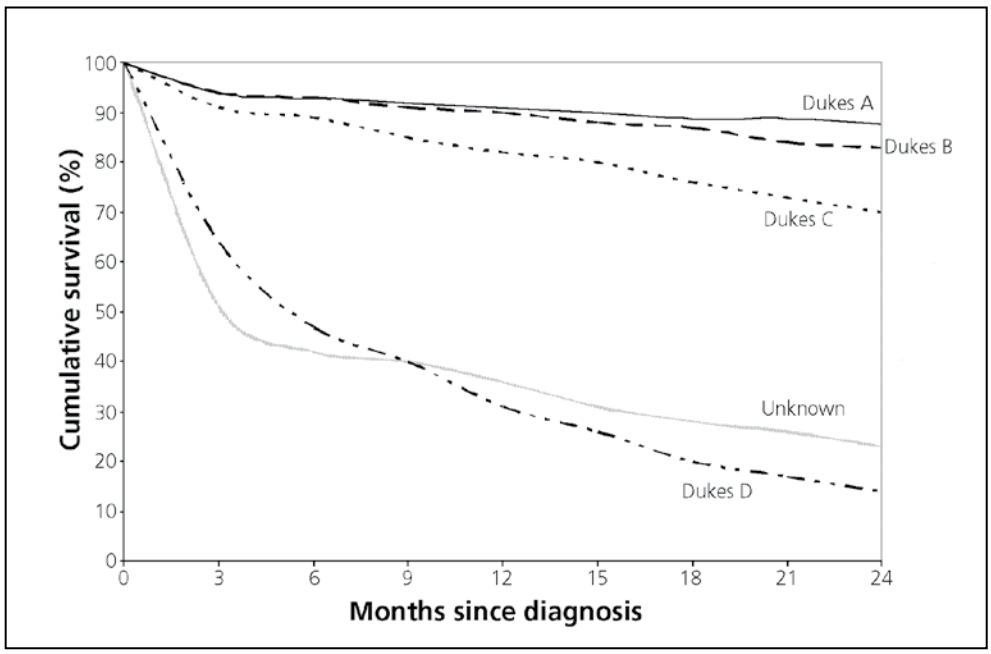


Figure 7: Observed survival by stage of disease for patients with cancer of the rectum

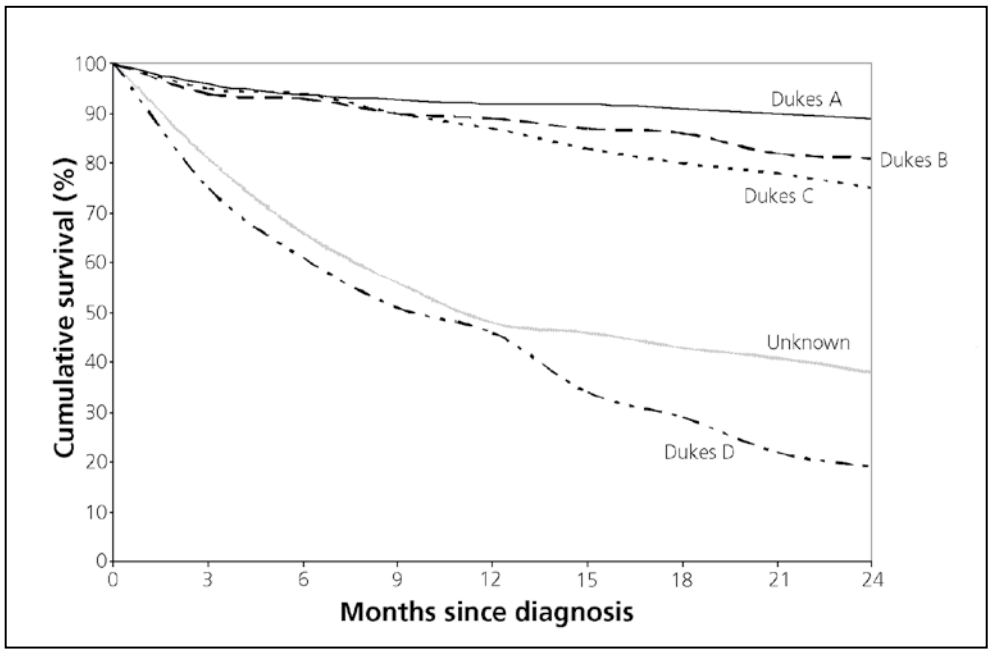
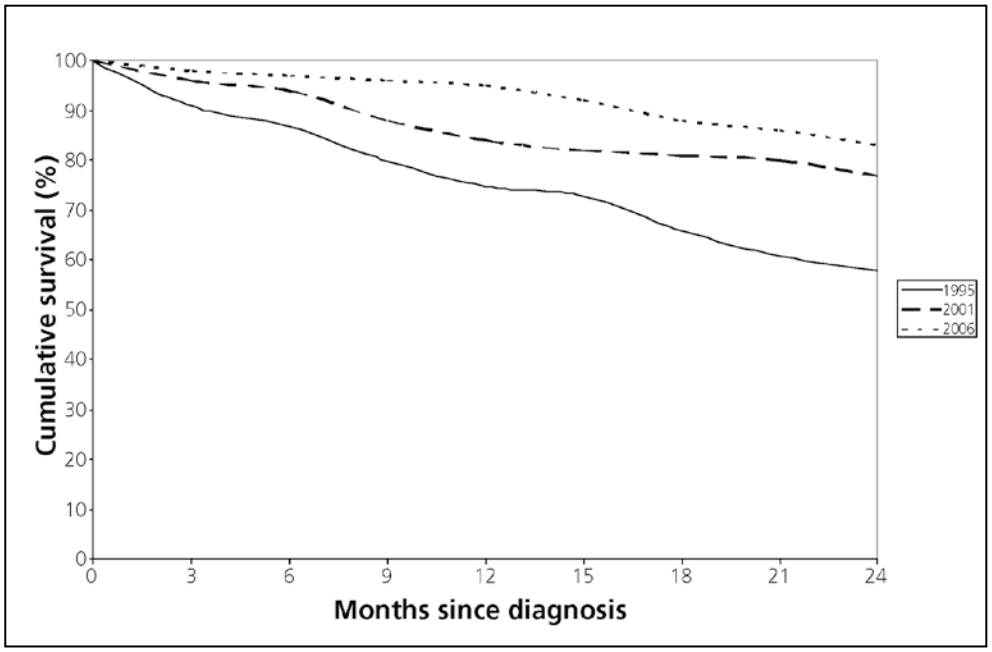


Figure 8: Observed survival for Dukes C patients with cancer of the rectum



- The observed survival of rectum patients with Dukes C disease in 2006 was significantly (P<0.001) higher than that of those Dukes C patients in 1996 and 2001; the 24-month observed survival of patients was 58% in 1996, 77% in 2001 and 83% in 2006 (Figure 8).
- Of those rectum patients with Dukes C disease 28% in 2006 were aged below 65 years compared with 41% and 43% in 1996 and 2001.
- In 2006, fewer Dukes C rectum patients had a resection (90%), compared with the earlier audit years (98% in 1996 and 96% in 2001).
- Note the improvements recorded for Dukes C rectal cancers could be due to stage shift as a result of increased use of scans etc.

SECTION III – COLORECTAL CANCER SUMMARY

STUDY PATIENTS AND RISK FACTORS

- There were a total of 2444 patients reported on for the years 1996, 2001 and 2006.
- In 2006, there were 913 colorectal study patients, 583 with cancer of the colon, 71 cancer of the RS junction, 246 cancer of the rectum and 13 cancer of the anus.
- The male to female ratio was approximately 50:50 for cancer of the colon and 60:40 for cancer of the RS junction and cancer of the rectum.
- Aggregated over all years, the average age at diagnosis was 69 years for males and 71 years for females.
- There was no association between colorectal cancer and deprivation.
- 16% of patients in 2006 had a family record for colorectal cancer.

PRESENTATION

- 80% of colorectal cancer patients were referred by their GP with an increasing percentage recorded as admitted via A & E, 36% by 2006 (43% colon and RS junction, 21% rectum).
- 14% of patients with colorectal cancer had a history of diverticular disease.
- About one patient in ten had a personal history of another malignancy.
- Abdominal pain was the most common presenting symptom for colon & RS junction cancer (62%), whilst for patients with cancer of the rectum it was rectal bleeding (79%).
- In 2006, 913 patients presented to 21 hospitals, a reduction from 25 hospitals in 1996 and 23 in 2001.
- In 2006, 55% of colorectal cancer patients presented to a Cancer Unit or the Cancer Centre in Belfast.
- The majority of colorectal cancer patients presented to a hospital within their own Board of residence.

INVESTIGATIONS AND ASSESSMENT

- By 2006, recording of ASA grading had improved to 72% (48% in 1996).
- In 2006, only 11% of patients were graded as being a normally healthy individual, however 28% were ungraded.
- In 2006, 92% of patients had a CT abdomen, 67% a chest X-ray, 48% a colonoscopy and 51% a MRI, all an increase on 1996 and 2001.
- In 2006, 7% of patients had a PET scan.
- The percentage of patients having a sigmoidoscopy in 2006, was lower than 1996 (47% and 52% respectively).
- In 2006, significantly fewer patients had a barium enema and USS abdomen than 1996 and 2001.
- The pattern for each investigation was similar regardless of age.
- The SHSSB had higher use of sigmoidoscopy over the audit period than in other Boards.
- By 2006, more than half of patients in each Board had a colonoscopy, an increase on previous years. The exception being the SHSSB where only a quarter of patients had a colonoscopy.
- Endorectal USS for rectal patients was most commonly used in the WHSSB (55% in 2006, compared with 10% in EHSSB, 1% in the NHSSB and 3% in the SHSSB).

STAGING

- Colon & RS junction
  - In 2006, 72% of patients had Dukes stage and 14% had TNM stage recorded in their clinical notes (77% and 14% respectively in 2001).
  - Using information available in the notes, it was possible to assign a Dukes stage to 91% of patients.
  - By 2006, three quarters of resection patients had 11 nodes or more examined (56% in 2001).
- Rectum
  - In 2006, 62% of patients had Dukes stage and 15% had TNM stage recorded in their clinical notes (62% and 7% respectively in 2001).
  - Using information available in the notes, it was possible to assign a Dukes stage to 85% of patients.
  - In 2006, 65% of resection patients had 11 nodes or more examined (31% in 1996, 43% in 2001).
- Overall, the recording of stage was similar in each Board.
- In each year, staging was most poorly recorded in patients aged 75 years and older.
- In 2006, 4% of patients with cancer of the colon & RS junction undergoing surgery were unstaged, (8% of patients with cancer of the rectum).
- The percentage of colorectal patients with nodes examined increased (83% in 1996, 94% in 2001 and 97% in 2006).

HISTOLOGY

- Approximately 90% of patients had a histological diagnosis of colorectal cancer with the majority adenocarcinomas.

RECORDING OF MULTIDISCIPLINARY TEAM MEETINGS

- Discussion of patients at a MDT improved from 21% in 2001 to 60% in 2006 with the highest level for residents of the Western Board at 92% for all patients, 93% for surgery patients. In 2006, it was lowest for residents of the Northern Board at 21% and lower still for patients having surgery in Northern Board Hospitals at 10%. (Note 20% of Northern Board residents were treated in the Eastern Board hospitals).
- In 2006, the level of recorded MDT meetings in the notes was slightly higher for surgery patients (64%) than non surgery patients 60%.
- In 2006, 91% of patients who had a record of an MDT also had their stage recorded/ assigned.
- The increased recording in 2006 of MDT was noted across each stage and age group.
- Although there was improved recording in the clinical notes of the treatment plan, in 2006 42% of patients still did not have a treatment plan recorded in their notes.
- In 2006, 92% of patients in the WHSSB, 87%, in the SHSSB, 59% in the EHSSB and 21% in the NHSSB had a treatment plan recorded in their notes.

SURGERY

- By 2006, surgical procedures were carried out in fewer hospitals.
- For colon & RS junction cancer: 536 surgical procedures were carried out in 14 hospitals in 2006 compared with 547 procedures in 17 hospitals in 2001.
- For rectal cancers: 186 surgical procedures were carried out in 13 hospitals in 2006 compared with 171 procedures in 15 hospitals in 2001.
- By 2006, significantly fewer patients with cancer of the colon & RS junction were having a resection (75% in 2006, 86% in 2001, 83% in 1996).
- The percentage of colorectal cancer patients having a "resection only" decreased between 2006, 2001 and 1996 (49%, 57% and 63% respectively).

- In 2006, more than half of patients with cancer of the rectum had a resection with stoma formation performed (15% of patients with cancer of the colon & RS junction).
- For patients with cancer of the colon & RS junction, right hemicolectomy was the most frequent resection performed in each audit year (40% in 2006).
- Anterior resection was the most frequent resection performed across the period for patients with cancer of the rectum (41% in 2006).
- In 2006, fewer patients with cancer of the colon & RS junction had a sigmoid colectomy performed (10% in 2006, 16% in 1996).
- In 2006, there was a significant increase in the recording of TME for rectal cancers and cancer of the RS junction (64% and 42% respectively). The improvement was noted for each hospital.

HOSPITAL OF SURGERY

- In 2006, 63% of colon & RS junction cancer surgery and 74% rectal cancer surgery were performed in the Cancer Centre or Cancer Units (64% and 67% respectively in 2001).
- The majority of patients were operated on within their own Board of residence in each of the Audit years.
- For surgery patients with cancer of the colon & RS junction in 2006, 17% residing in the NHSSB had their operation performed in the EHSSB.
- In 2006, a third of surgery patients with cancer of the rectum residing in the NHSSB had their operation in the EHSSB.
- For residents in the WHSSB there was a shift in hospital of operation from Tyrone County Hospital to the Erne Hospital by 2006.

SURGEON WORKLOAD

- In 2006, 95 operators were involved in resections for 494 colon & RS junction cancers, 34 operators for 169 rectal cancers.
- Around 90% of patients with colon & RS junction cancer had their resection performed by a consultant surgeon. For patients with cancer of the rectum it was 96%.
- By 2006, 20 surgeons in training operated on colorectal patients.
- In 2006, 41% of patients with colorectal cancer had their resection performed by someone who undertook at least 20 of those procedures that year.
- 15% of colorectal patients had their surgery performed by a surgeon undertaking less than 5 of these procedures.
- In 2006, of those patients with cancer of the colon and RS junction having a resection, half had their surgery carried out by a surgeon undertaking at least 10 of these procedures annually.
- In 2006, of rectal cancer patients undergoing surgery, 27% had surgery carried out by a surgeon undertaking at least 10 of these procedures annually.

ONCOLOGY

- By 2006, there were more colorectal cancer patients receiving chemotherapy (31% in 2006, 29% in 2001 and 24% in 1996)
- For patients with cancer of the colon & RS junction, the percentages of patients in 2001 and 2006 who received chemotherapy were similar, but higher than that of 1996.
- For patients with cancer of the rectum 32% received chemotherapy in 2001 and 2006, an improvement on 1996 (21%).
- By 2006, there were more colorectal cancer patients receiving radiotherapy (17% in 2006, 12% in 2001 and 10% in 1996).
- For patients with cancer of the colon & RS junction, 4% of patients received radiotherapy in 2001 and 2006, compared with 2% in 1996.
- There was an increase in rectal cancer patients having radiotherapy, whether as the sole treatment or as a combination with surgery and chemotherapy from 24% in 1996, 33% in 2001 to 47% in 2006.

- The percentage of patients with cancer of the rectum receiving surgery and radiotherapy as a treatment combination increased from 13% in 1996 to 22% in 2006.
- In 2006, fewer patients with cancer of the rectum received surgery as their only form of treatment (56% in 1996, 40% in 2001 and 28% in 2006).
- There was a significant increase in the number of colorectal cancer patients who did not have any form of treatment recorded in their hospital notes (15% in 2006, 9% in 1996).
- By 2006, 54% of colorectal cancer patients who did not receive treatment were Dukes D, (44% did not have stage recorded in their notes).
- In 2006, 96% of patients with Dukes D and 70% of patients with stage unknown or not recorded, who received no treatment were deceased within one year of diagnosis.
- By 2006, 58% of patients who did not receive treatment were at 80 years or older at diagnosis compared with 42% under 80 years.

TIMELINES

Colorectal

- There was better recording of timelines in 2001 and 2006.
- The number of days between referral and first seen at hospital were similar over the period, with more than half of colorectal patients seen within two weeks.
- By 2006, almost half of colorectal patients had a diagnosis within two weeks of being first seen at hospital.
- In 2006, there were greater delays in the times to surgery, with 54% of colorectal patients having surgery within two weeks of diagnosis, (71% in 2001).
- Waiting times for patients receiving a sigmoidoscopy differed little over the three time points.
- In 1996 and 2006, 29% of patients had their CT within two weeks from the date they were first referred to hospital with a suspected cancer. However in 1996 only 31 patients had a CT of the abdomen, whilst in 2006 the number increased to 233 patients.

Colon & RS junction

- In all years, about 60% of patients were seen within two weeks of referral to hospital.
- By 2006, 46% of patients had a diagnosis within two weeks of being first seen at hospital (47% in 1996).
- Between 1996 and 2006, a smaller percentage of patients had a sigmoidoscopy within two weeks from referral (35% in 2006 compared with 50% in 1996).
- Between 1996 and 2006, patients' waiting time from referral with a suspected cancer to CT abdomen improved; 34% of patients had their CT within two weeks from referral in 2006 compared with 31% in 1996.
- Between 1996 and 2006, patients' waiting time from diagnosis to surgery was longer, with 65% of patients having their surgery within two weeks of diagnosis in 2006 compared with 87% in 1996. Excluding patients presenting as emergencies and those receiving neo-adjuvant therapy, 47% of patients had their surgery within two weeks in 2006 and 86% in 1996.

Rectum

- By 2006, 41% of patients were seen within two weeks of referral to hospital, with 56% of patients diagnosed within two weeks of being first seen at hospital, slight improvements on 2001.
- In 2006, 18% of patients had a CT abdomen within two weeks from referral with a suspected cancer.
- Between 1996 and 2006, a smaller percentage of patients had a sigmoidoscopy within two weeks from referral with a suspected cancer (28% in 2006 compared with 38% in 1996).

- Between 1996 and 2006, patients' waiting time from diagnosis to surgery was poorer, with 24% of patients having their surgery within two weeks of diagnosis in 2006 compared with 62% in 1996. Excluding patients presenting as emergencies and those receiving neo-adjuvant therapy, 32% of patients had their surgery within two weeks in 2006 and 65% in 1996.

ONWARD REFERRAL/CLINICAL TRIALS

- By 2006, significant increases in referrals to GP, Community nurse, MacMillan nurse, and Hospice were noted. In 1996, 5% of patients had a referral to a Macmillan nurse, with 30% referred in 2006.
- In 2006, significantly more patients were given information on support groups/ education (less than 1 % in 1996 and 2001, and 12% in 2006).
- There was little change in referral to Marie Curie nurses and psychologist over the period.
- The number of patients referred to the oncology centre increased from 41% in 1996 to 60% in 2006.
- Few patients were entered into clinical trials (14% in 1996 and 2% in 2006).

COMMUNICATION

- By 2006, over 90% of patients had information on discussion of diagnosis, treatment plan recorded in their notes, that their psycho-social needs had been considered, all improvements on 1996 (49%, 48% and 40% respectively).
- In 2006, 72% of patients had their management discussed with an oncologist, whilst 60% were referred to an oncology centre, each of these were improvements on 1996 and 2001.
- For those patients with a record in their notes of having had a caecostomy, colostomy or ileostomy, 93% in 2006 were seen by a stoma therapist, an improvement on 1996 and 2001 (58% and 65% respectively).

OUTCOMES

- The observed survival of patients with cancer of the colon & RS junction was similar over 1996, 2001 and 2006, with a 2-year observed survival of approximately 60%.
- The observed survival of patients with cancer of the rectum improved between 1996, 2001 and 2006; the 2-year observed survival of patients was 67% in 2006, 61% in 2001, and 57% in 1996.
- For those patients with cancer of the colon & RS junction who had surgery, there was little difference in the observed survival between the audit years; the 2-year observed survival was around 65%.
- For those patients with cancer of the rectum who had surgery, survival was significantly different between years; the 2-year observed survival was 84% in 2006, 70% in 2001, and 60% in 1996.
- There was a highly significant difference in the overall survival of colorectal cancer patients by stage, with late Stage IV disease patients having the poorest overall survival, 32% at 2-years, compared with 88% for Stage I patients.
- The observed survival of rectal patients with Dukes C disease in 2006 was significantly higher than that of those in 1996 and 2001; the 2-year observed survival of Dukes C patients was 78% in 2006, 69% in 2001 and 64% in 1996.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

By 2006, the following improvements were apparent:

- Increased use of MRI scan, CT abdomen, chest X-ray, and colonoscopy.
- More patients had 11 nodes or more examined.
- Fewer patients having a resection as their only form of treatment.
- There were no open and closed operations in 2006, indicating better preoperative diagnosis using scans.
- Improved discussion of patients at MDT however with low participation in Northern Board.
- Increased use of Total Mesorectal Excision for rectal cancers.
- A doubling in the use of radiotherapy for rectal cancer to 47% of patients.
- Most patients (93%) with a stoma formation were referred to a stoma therapist.
- Recording of treatment plan in patient notes improved.
- There was an improvement in information to the patient, family and GP.
- There was a marked improvement in survival for patients with cancer of the rectum, in particular patients with Dukes C and those who had surgery.

However in 2006,

- Difficulties for services persist as 43% of patients with colon & RS junction cancer patients and 21% of rectal cancer patients present via A & E.
- There was geographical variation in the use of diagnostic tests with higher use of sigmoidoscopy and lower use of colonoscopy in the Southern area.
- Discussion of patients at MDT varied with low participation in the Northern Trust.
- There were still a high number of operators carrying out a low volume of procedures in 2006. 25 surgeons did only one surgical procedure related to the treatment of colorectal cancer.
- There were greater delays in diagnosis to surgery.
- Few patients were entered into clinical trials.
- There was no significant improvement in survival for patients with cancer of the colon & RS junction.

RECOMMENDATIONS

- The number of operators treating colorectal cancer was too high. There needs to be further specialisation.
- Differences in use of investigations should be rationalised.
- All patients should be discussed at an MDT.

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APPENDICES

APPENDIX A: Summary of recommendations of the 'Campbell Report', that is, Cancer Services: Investing for the Future[1], 1996.

1. The management of patients with cancer should be undertaken by appropriately trained, organ and disease specific medical specialists.
2. All patients with cancer should be managed by multidisciplinary, multiprofessional specialist cancer teams.
3. A Cancer Forum should be established involving all key interests in the delivery of cancer services.
4. Cancer Units should, in conjunction with local GPs and other providers, develop an effective communication strategy.
5. Northern Ireland should have one Cancer Centre, which in addition to its regional role, should act as a Cancer Unit to its local catchment population of around half a million.
6. There should be four other Cancer Units, one in each Board area, each serving a population of around a quarter of a million.
7. Radiotherapy services, together with chemotherapy services, should be moved as soon as possible to the Belfast City Hospital and become an integral part of the regional Cancer Centre.
8. Each Cancer Unit should develop a chemotherapy service. This service should be staffed by designated specialist nurses and pharmacists, and should be overseen by the non-surgical oncologist attached to the unit, with back-up from a haematologist.
9. There should be a minimum target of 13 consultants in non-surgical oncology for Northern Ireland by 2005.
10. Any new appointments of trained cancer specialists should be to Cancer Units or to the Cancer Centre.
11. Guidelines should be drawn up and agreed for the appropriate investigation and management of patients presenting to non-Cancer Unit hospitals who turn out to have cancer.
12. The Cancer Centre and Cancer Units should each develop a specialist multiprofessional palliative care team.
13. There should be a comprehensive review of palliative care services in Northern Ireland.
14. The Northern Ireland Cancer Registry should be adequately resourced.

The above recommendations outlined the change that was necessary to improve cancer care.

APPENDIX B: Summary of recommendations of the Report of the Colorectal Cancer sub-group in Cancer Services – Investing for the Future – Cancer Working Group Sub-Group Reports[2], 1996.

1. There should be a multidisciplinary approach to the investigation and management of colorectal cancer.
2. Physicians and surgeons with a primary interest in colorectal diseases should be identified to general practitioners, the medical community, Purchasers and the public.
3. Designation as a specialist in colorectal and gastrointestinal diseases should be based on clinical expertise, experience, education and training.
4. The future management of colorectal cancer should be carried out mainly by a multidisciplinary group of enthusiasts with training in colorectal diseases, rather than occasional practitioners.
5. There should be agreed protocols of management generated by the multidisciplinary group and the results of treatment should be audited regularly.
6. Details of all new cases of colorectal cancer should be submitted to the N.Ireland Cancer Registry and data from the first five years of the Registry should be disseminated widely.
7. Information about current standards of practice in colorectal disease in the United Kingdom should be widely disseminated to primary care physicians and Purchasers.
8. Clinical practice in colorectal cancer should be complemented by a commitment to basic, clinical and applied research into the epidemiology, treatment and prevention of cancer.

APPENDIX C: Guidelines for the Management of Colorectal Cancer, 2001 – Issued by the Association of Coloproctology of Great Britain and Ireland. (Summary of guidelines)[3]

1. Investigation

i) It is recommended that patients with higher-risk symptoms should be fast-tracked either in special clinics or with urgent appointments to routine clinics. Patients referred through such clinics should be investigated with either flexible or rigid sigmoidoscopy plus a high quality double contrast barium enema or colonoscopy, when appropriate.

ii) Preoperative histology should be obtained from all rectal tumours.

iii) Doctors carrying out colonoscopy should audit their results, and expect to achieve a high total colonoscopy rate with a low perforation rate.

iv) It is acceptable for non-consultant staff to perform double contrast barium enemas, provided they have completed a recognised training programme, the examinations are performed to strict protocols and supervised by a consultant radiologist.

v) All patients, particularly those with rectal cancer should have pre-operative staging to determine the local extent of the disease and the presence of lung and liver metastases. Endorectal ultrasound scanning should be performed to identify T1 rectal cancers, where local excision is being considered. CT or MRI scans should be undertaken to assess involvement of adjacent organs in more advanced tumours.

vi) Surveillance and genetic testing should be offered to all FAP families and HNPCC families that either meet the Amsterdam criteria or have a confirmed mismatch repair gene mutation.

vii) First degree relatives of patients who develop colorectal cancer before the age of 45 years and members of families in which multiple cancers have occurred should be seen by a specialist, preferably with experience in genetic counselling, who can evaluate their risk of developing the disease and advise on appropriate investigations and surveillance.

2. Access to Treatment

i) Patients should expect to receive initial treatment within 4 weeks between making a diagnosis of colorectal cancer and start of therapy.

ii) Colorectal cancer should be treated by surgeons with appropriate training and experience and who work as part of a multidisciplinary team.

iii) All patients with colorectal cancer should have the benefit of a suitably informed surgical opinion and their management should be considered by the multidisciplinary team.

iv) Patients with colorectal cancer should have access to a colorectal nurse specialist for advice and support during their treatment.

3. Preparation for Surgery

i) All patients undergoing surgery for colorectal cancer should give informed consent. Informed consent implies being given information about the likely benefits and risks of the proposed treatment and details of any alternatives. Informed consent should be obtained by the operating surgeon where possible.

ii) The patient who may require a stoma should be seen by a stoma nurse prior to surgery and the referral should be made at the earliest opportunity to allow adequate time for preparation.

iii) Blood should not be withheld if there is a clinical indication to give it, and preparations for blood transfusion should be made in all patients undergoing surgery for colorectal cancer except where an individual patient refuses.

iv) Mechanical bowel preparation prior to surgery is recommended.

v) Subcutaneous heparin and/or intermittent compression should be employed as thromboembolism prophylaxis in surgery for colorectal cancer unless there is a specific contraindication.

vi) All patients undergoing surgery for colorectal cancer should have antibiotic prophylaxis. It is impossible to be dogmatic as regards the precise regime, but a single dose of appropriate intravenous antibiotics appears to be effective.

4. Elective Surgical Treatment

i) It is recommended that the term curative resection should be based on histological confirmation of complete excision or residual tumour. Surgeons should expect to achieve an overall curative resection rate of 60%, but it is appreciated that this will depend at least in part on the stage at which patients present.

ii) Any cancer whose distal margin is seen at 15 cm or less from the anal verge using a rigid sigmoidoscope should be classified as rectal.

iii) It is recommended that total mesorectal excision should be performed for cancer in the lower two thirds of the rectum, either as part of a low anterior resection or an abdomino-perineal resection (APER). In tumours of the upper rectum the mesorectum should be divided no less than 5 cm below the lower margin of the tumour. Care should be taken to preserve the pelvic autonomic nerves and plexuses, and perforation of the tumour during operation should be avoided.

iv) Although no definite recommendations can be made regarding anastomotic technique, the interrupted serosubmucosal method has the lowest reported leak rate and stapling facilitates ultra-low pelvic anastomoses. After anterior resection and total mesorectal excision the judicious use of a temporary defunctioning stoma is recommended, and the formation of a colonic pouch should be considered.

v) Cytocidal washout of the rectal stump should be undertaken prior to anastomosis.

vi) The proportion of rectal cancers treated by abdomino-perineal excision of the rectum (APER) should be less than 40%, and, if distal clearance of 1 cm can be achieved, a low rectal cancer may be suitable for anterior resection. If a surgeon has any doubt regarding the choice between these two operations, an experienced second opinion should be sought.

vii) Local excision for cure in rectal cancer should be restricted to T1 cancers with well or moderate differentiation less that 3cm in diameter. It must be accepted that subsequent histopathological examination of cancers thought to be suitable for local excision will identify a small proportion which require more radical surgery.

viii) Laparoscopic surgery for colorectal cancer should only be performed by experienced laparoscopic surgeons who have been properly trained in colorectal surgery and who are entering their patients into one of the national trials.

5. Record Keeping

i) There are existing guidelines for the keeping of clinical records issued by the Royal College of Surgeons (RCS 1990), and these should be adhered to for patients with colorectal cancer.

ii) A check-list should be used to construct an operation note for patients undergoing surgery for colorectal cancer.

iii) All patients with colorectal cancer should be brought to the attention of the Colorectal Multidisciplinary Team. Records of these meetings, the cases discussed and the outcomes agreed must be recorded.

6. Emergency Treatment

i) Emergency surgery should be carried out during daytime hours as far as possible, by experienced surgeons and anaesthetists.

ii) In patients presenting with obstruction, steps should be taken to exclude pseudo-obstruction before operation.

iii) Stoma formation should be carried out in the patient's interests only, and not as a result of lack of experienced surgical staff.

7. Adjuvant Therapy

i) Patients with Dukes C colon cancer should be considered for adjuvant chemotherapy.

ii) Patients with Dukes B colon cancer should be considered for entry into randomised trials of adjuvant chemotherapy

iii) Patients with high risk Dukes B colon cancer should be individually counselled about their level of risk and possible benefits of chemotherapy.

iv) There is no evidence to support the use of adjuvant chemotherapy in Dukes A cancers of colon or rectum.

v) No definite recommendation can be made regarding adjuvant chemotherapy for patients with Dukes C rectal cancer. Patients may be either offered chemotherapy or be considered for clinical trials, in addition to appropriate adjuvant radiotherapy.

vi) Systemic chemotherapy should only be administered by clinical staff with appropriate training and experience, according to JCCO guidelines.

vii) Patients with a mobile rectal cancer should be considered for entry into clinical trials of preoperative radiotherapy.

viii) Patients with rectal cancer in whom the tumour is tethered or in whom local imaging indicates a high risk of incomplete resection should be selected for long course pre-operative radiotherapy to obtain tumour downstaging.

ix) In patients with rectal cancer pre-operative radiotherapy using short course (25 Gy in 5 fractions in one week) or longer course (40-45 Gy in 20-25 fractions over 4-5 weeks) are both acceptable.

x) In patients with rectal cancer who have not had pre-operative radiotherapy, post-operative radiotherapy and chemotherapy should be offered to patients with well established predictors of risk (e.g. evidence of tumour at the circumferential resection margins).

xi) In patients with rectal cancer post-operative radiotherapy doses should be 40-50 Gy in 20-25 fractions or a suitable biological equivalent using a planned volume.

xii) A planned radiotherapy volume using three or four fields is recommended for rectal cancers as this results in less morbidity and mortality.

xiii) Patients with potentially operable rectal cancer should always be considered for entry into trials of adjuvant radiotherapy.

8. Treatment of Advanced Disease

i) For fit patients with inoperable rectal carcinoma without evidence of metastatic disease, primary radiotherapy alone or in combination with chemotherapy should be considered.

ii) Patients with metastatic disease who are fit for active therapy should be accurately staged with CT scans of abdomen and thorax.

iii) Patients with evidence of unresectable metastatic disease should be referred to an oncologist for consideration of palliative chemotherapy as soon as the diagnosis of metastatic disease is made, but this may not be appropriate for elderly patients.

iv) Chemotherapy for metastatic colorectal cancer should only be given after discussion at a Multidisciplinary Team meeting and under the direction of recognised clinical and medical oncologists within facilities conforming to JCCO guidelines.

v) Entry into clinical trials evaluating the benefits of novel chemotherapy regimens in colorectal cancer should be encouraged.

vi) Palliative treatment should be 5FU given by infusion combined with the use of irinotecan in the first line or on 5FU failure if the patient remains fit for chemotherapy.

vii) Hepatic arterial infusional chemotherapy remains of unproven benefit.

viii) Patients with metastatic disease limited to the liver which is potentially resectable should be considered for partial hepatectomy by an experienced liver surgeon.

ix) Surgeons and oncologists who deal with colorectal cancer should make it a priority to build close links with palliative care specialists and units.

x) All clinicians who deal with colorectal cancer should be trained in communication skills, in the control of pain and other cancer symptoms.

xi) It is important that patients with colorectal cancer are offered the opportunity to ask questions and to have important information repeated. Provision of information should be an essential part of every consultation

9. Outcome

Measurement of outcomes is an essential part of colorectal cancer care. In order to undertake measurement of outcomes manpower resources and IT facilities are required. These facilities are currently lacking in many hospitals.

Colorectal Cancer Units should carefully audit the outcome of treatment and achieve:

i) An operative mortality of 15-25% for emergency surgery and 4-7% for elective surgery with colorectal cancer.

ii) Intensive care and high dependency care are an essential part of peri-operative colorectal cancer care and should be available in hospitals undertaking colorectal cancer surgery.

iii) Wound infection rates after surgery for colorectal cancer should be around 10%.

iv) A clinical anastomotic leak rate of around 8% for anterior resections and around 4% for other types of resection. However ultra low pelvic anastomoses will have higher leak rates (around 15%) and therefore the judicious use of a defunctioning stoma is recommended.

v) Local recurrence rates after curative resection for rectal cancers should be around 10% within 2 years of follow up.

10. Follow-Up

i) Although there is no evidence that intensive follow up for the detection of recurrent disease improves survival, it is reasonable to offer liver imaging to asymptomatic patients during the first two post-operative years for the purpose of detecting operable liver metastases.

ii) Although there is no evidence that colonoscopic follow-up improves survival, it has been shown to yield adenomatous polyps and cancers. If such a policy is pursued, it is recommended that a "clean" colon should be examined by colonoscopy at 3-5 year intervals.

iii) Follow-up is necessary for audit, which should be structured to determine post-operative mortality, anastomotic leak rates, colostomy rates and 5-year survival. This should be regarded as a routine part of a Cancer Unit's work.

iv) All patients with a stoma should have ready access to specialist nursing staff.

11. Histopathology

i) All resected polyps and cancers should be submitted for histopathological examination.

ii) Pathology reports should contain information on all of the data items contained in the Joint National Guidelines Minimum Data Set for Colorectal Cancer Histopathology Reports.

iii) Pathology laboratories should store stained histology slides for a minimum of 10 years, and tissue blocks from specimens indefinitely, in order to facilitate future case review, clinical audit, and research.

iv) Pathological examination of colorectal cancer specimens should be carried out in laboratories which perform to high technical standards such as those required for Clinical Pathology Accreditation, and participate in external quality assessment schemes and regular audit of technical procedures and diagnosis.

APPENDIX D: Summary of recommendations of the NICE guidance on cancer services on: Improving outcomes in colorectal cancer, NICE, 2004[5]

Key priorities for implementation were identified as follows:

- Action should be taken to improve recognition of potential symptoms of colorectal cancer in primary care and in the community. Efficient systems should be set up to ensure that patients who may have colorectal cancer are rapidly referred for endoscopy.
- There is an urgent need for substantial expansion of lower gastrointestinal (GI) endoscopy services. Access to both flexible sigmoidoscopy and colonoscopy should be improved and the focus of diagnostic effort should move from barium enema to endoscopy. (Note - This will be crucial for screening services when they are introduced.)
- Cancer Networks and Trusts should review the composition and function of colorectal cancer multi-disciplinary teams (MDTs) and make sure that each MDT has a coordinator. They should:
  - Establish systems within Trusts to ensure that all patients with suspected or newly diagnosed colorectal cancer are promptly referred to, and managed by, a colorectal cancer MDT.
  - Review operational links with hepatobiliary (HPB) services and the relevant clinical teams to ensure that patients with potentially resectable liver metastases are referred to specialist MDTs for assessment.
  - Identify specialist MDTs which will manage patients with anal cancer.
- Emergency patients (particularly those with intestinal obstruction) should be managed by colorectal cancer MDTs. This may require the development of emergency teams and transfers of patients between neighbouring hospitals.
- Patients with rectal cancer should be managed by teams trained in all aspects of total mesorectal excision (TME), including pre and post-operative assessment, surgical technique, and the role of clinical oncology.
- All aspects of patient-centred care should be re-assessed in the light of recommendations in this manual update. In particular, Trusts should:
  - Improve the provision of appropriately trained staff and resources;
  - Ensure that patients receive all the information they want at all times;
  - Arrange ongoing support for patients and carers from a clinical nurse specialist who is encouraged to play an active part in MDT discussions.

APPENDIX E: Staging of Colorectal Cancer

Accurate staging
Accurate staging is essential for the planning of appropriate treatment and for the comparison of the outcomes of such treatment (surgical and non-surgical).

Clinical staging
This involves physical examination, endoscopic examination (sigmoidoscopy/ colonoscopy) and imaging using barium enema and endorectal MRI (rectal tumours only). Additional investigations to detect metastatic disease include chest X-ray, CT scanning and newer imaging techniques such as PET scanning.

Pathological staging
Pathological staging adds significant information to this process. It is only possible following surgical exploration of the abdomen and pathological examination of the surgically resected specimen. This will include the section of bowel containing the tumour with its lymph node- bearing mesentery. This gives more exact information on the depth of the tumour invasion in the intestinal wall (T) and detects the presence of metastatic tumour within the examined lymph nodes (N). It may also provide histological evidence of distant metastases (M) by sampling suspect areas in the liver (see Table 1).

The Dukes classification system, which placed patients into one of three categories (Stages A, B, C) was first introduced in 1932 and was subsequently modified by Astler-Coller to include a fourth stage (Stage D). Dukes A and B tumours are confined to the bowel wall, while Dukes C tumours have metastasized to the regional lymph nodes and Dukes D tumours have spread to distant sites. More recently, the American Joint Committee on Cancer (AJCC) and UICC (International Union Against Cancer) have introduced the TNM staging system, which places patients into one of four stages (Stage I-IV). The TNM classification provides more detail and more precision in identifying prognostic groups than the Dukes staging system. Both systems are shown in Table 2.

Table 1 TNM classification of colorectal cancer[17]

Tumour

T0	no evidence of primary tumour
T1	tumour invades submucosa
T2	tumour invades muscularis propria
T3	tumour invades through the muscularis propria into the subserosa, or into the non-peritonealized pericolic or perirectal tissue
T4	tumour directly invades other organs or structures, and /or perforates visceral peritoneum (serosa)
T4a*	tumour directly invades other organs or structures without perforating the visceral peritoneum
T4b*	tumour directly invades other organs or structures with perforation of the visceral peritoneum

Nodes

NX	regional nodes not assessed
N0	No regional lymph node metastases
N1	metastases in 1 to 3 regional nodes
N2	metastases in 4 or more regional nodes

Metastases

MX	Distant metastases cannot be assessed
M0	no distant metastases
M1	distant metastases

In order to facilitate survival analysis the assigned TNM profile is condensed into a stage group category of which there are 7 (I, IIA, IIB, IIIA, IIIC and IV, see Table 2).

Table 2 Stage Group Colorectal Cancer

Stage	***T***	***N***	***M***	***Dukes***
I	T1	N0	M0	A
	T2	N0	M0	A
IIA	T3	N0	M0	B
IIB	T4	N0	M0	B
IIIA	T1-T2	N1	M0	C
IIIB	T3-T4	N1	M0	C
IIIC	any T	N2	M0	C
IV	any T	any N	M1	D*

** Modified Dukes*

Example:

- Examination of the resected tumour shows penetration into but not beyond the muscle layer of the bowel therefore **T** = T2
- Regional nodes sampled and are negative for metastases, therefore **N** = N0.
- Clinically/radiologically there is no evidence of distant metastases and is therefore **M** =M0.

TNM profile is **pT2 pN0 cM0** (p = determined pathologically, c = clinically determined).

This TNM profile is assigned to stage group I or Dukes A.

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