Colorectal Cancer
Management
Clinical Guidelines

Prepared by The Clinical Guidelines Committee
Royal College of Surgeons in Ireland
November 2002
FOREWARD

The Clinical Guidelines Committee is very pleased to be in a position to publish guidelines in the management of colorectal cancer. This form of malignant disease is common in Ireland and is of great importance to all general surgeons in the country. It is still usual for the disease to present at an advanced stage, either as an emergency with intestinal obstruction or with metastatic disease. Advances and improvements in treatment are recognised and have made a significant impact to prognosis, particularly in patients with rectal cancer. All surgeons treating patients with colorectal cancer are aware of the rapid rate of change in the management of patients with rectal cancer. Newer methods of staging have led to changes in the sequence of treatment in many instances so that primary radiotherapy followed by meticulous radical surgery is now appropriate for many patients. The role, the scheduling and the composition of adjuvant chemotherapy all remain under continual evaluation. The value of adjuvant chemotherapy in node-negative colon cancer remains uncertain.

Continuing challenges for the surgeon include the management of patients with unresectable and metastatic disease as well as those with recurrence after resection. The increasing value of multidisciplinary meetings for patients with cancer will require the surgeon to retain a central role in the management of all patients with malignant disease.

It should be emphasised that guidelines are not strict protocols and that they always leave scope for the individual judgement of the experienced surgical clinician. It is hoped that these guidelines will be reviewed and renewed periodically and that they will be found to be useful to the surgical community in planning investigation and treatment of their patients.

Although drawing extensively from existing published guidelines, the development of this booklet has required a great deal of effort and consultation in its preparation. Mr. Peter Gillen has consulted extensively with colleagues and with relevant societies, has co-ordinated all the available documentation and has assembled it in a coherent fashion. The Clinical Guidelines Committee is most grateful to him for his efforts.

We are also most grateful to the Irish Society of Gastroenterology, the Association of Coloproctology of Great Britain and Ireland, the Scottish Intercollegiate Guidelines Network, the Irish Society of Coloproctology and many individual surgeons from these organisations whose advice and suggestions have been incorporated into this booklet.

The assistance of Ms. Paula Wilson and her administrative colleagues and that of Ms. Beatrice Doran, Librarian, is acknowledged gratefully and the support and encouragement of the President and Council has also been genuinely appreciated by the Clinical Guidelines Committee.

Niall O'Higgins
Chairman, Clinical Guidelines Committee
November, 2002.
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreward</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>Aims/Purpose</td>
<td>4</td>
</tr>
<tr>
<td>Validity</td>
<td>4</td>
</tr>
<tr>
<td>Summary of Guidelines</td>
<td>5</td>
</tr>
<tr>
<td>Investigations</td>
<td>10</td>
</tr>
<tr>
<td>Methods of Investigation</td>
<td>12</td>
</tr>
<tr>
<td>Pre-Operative Assessment</td>
<td>14</td>
</tr>
<tr>
<td>Preparation for Surgery</td>
<td>14</td>
</tr>
<tr>
<td>Surgical Technique</td>
<td>17</td>
</tr>
<tr>
<td>Emergency Surgery</td>
<td>20</td>
</tr>
<tr>
<td>Adjuvant Chemotherapy</td>
<td>21</td>
</tr>
<tr>
<td>Treatment of Advanced Disease</td>
<td>24</td>
</tr>
<tr>
<td>Outcome</td>
<td>28</td>
</tr>
<tr>
<td>Follow-Up</td>
<td>29</td>
</tr>
<tr>
<td>Nursing Care</td>
<td>31</td>
</tr>
<tr>
<td>Histopathology Reporting</td>
<td>32</td>
</tr>
<tr>
<td>References</td>
<td>39</td>
</tr>
</tbody>
</table>
Colorectal cancer constitutes the single largest diagnostic group of noncutaneous cancers in Ireland. The number of colorectal cancers exceeds the total number of breast and lung cancers and deaths from colorectal cancer were second only in number to those from lung cancer. Colorectal cancer represents about 9% of all noncutaneous cancers diagnosed and 13% of cancer related deaths are due to colorectal cancer (National Cancer Registry in Ireland, 1997).

The incidence of colorectal cancer is relatively high in Ireland which has the 5th highest incidence amongst women and the third highest incidence amongst men in European countries. In Ireland the cumulative probability of survival following a diagnosis of colorectal cancer is 71% at one year, 59% at two years and 50% at three years (National Cancer Registry). Colorectal cancer is frequently advanced at the time of first presentation and metastatic disease is present in up to 20% of patients at time of diagnosis. Heightened awareness of colorectal cancer among the general public and health care professionals may lead to earlier presentation, diagnosis and treatment with improved long term survival.

**PURPOSE**

The purpose of these guidelines is to assist clinicians and other health care professionals in decision-making and practice by removing uncertainty in areas where it is possible to do so. The guidelines are to serve as a benchmark of good clinical care and to be prescriptive of unacceptable clinical standards. They are not however intended to create a rigid framework in situations where there is reasonable difference of opinion. Thus clinical freedom, within limits defined by good practice, is preserved.

It is hoped that the establishment of national guidelines for the treatment of colorectal cancer will lead to introduction of local protocols, better clinical care leading to improved survival of patients with colorectal cancer.

**AIMS**

- To improve awareness of colorectal cancer in the community.
- To facilitate early diagnosis and treatment.
- To improve referral patterns of patients with proven colorectal cancer.
- To improve quality of life for patients with colorectal cancer.
- To improve disease-free intervals and overall survival in patients with colorectal cancer.

In 1995 there was some 17,000 deaths due to colorectal cancer in the U.K. The overall survival quoted in the literature is currently running at five year survivals of less than 40%. The high incidence of the disease and the fact that improvement in mortality has been modest highlights the need for better prevention, diagnosis and treatment. Advanced disease at first presentation is still common and has been quoted at over 20%. It is hoped that this percentage will reduce with heightened awareness of the disease among the general public.

**VALIDITY**

Definition of types of evidence taken from the US Agency for Health Care Policy & Research and are set out in the following tables.

<table>
<thead>
<tr>
<th>Level</th>
<th>Type of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia.</td>
<td>Evidence obtained from meta-analysis of randomised controlled trials.</td>
</tr>
<tr>
<td>Ib.</td>
<td>Evidence obtained from at least one randomised controlled trial.</td>
</tr>
<tr>
<td>Ila.</td>
<td>Evidence obtained from at least one well-designed controlled study without randomisation.</td>
</tr>
<tr>
<td>Ilb.</td>
<td>Evidence obtained from at least one other type of well-designed quasi-experimental study.</td>
</tr>
<tr>
<td>III.</td>
<td>Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.</td>
</tr>
<tr>
<td>IV.</td>
<td>Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities.</td>
</tr>
</tbody>
</table>
**SUMMARY OF GUIDELINES**

**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.

   Grade B

ii. Pre-operative histology should be obtained from all rectal tumours.

   Grade C

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

   Grade B

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.

   Grade C

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. Endoanal rectal ultrasound scan should be performed to identify T1 rectal cancers and CT or preferably MRI scan performed to assess involvement of adjacent organs in more advanced tumours.

   Grade C

vi. Surveillance and genetic testing should be offered to all families with Familial Adenomatous Polyposis (FAP) or families that either meet with Amsterdam criteria for Hereditary Non-Polyposis Colorectal Cancer (HNPCC) or have a confirmed mismatch repair gene mutation.

   Grade A

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.

   Grade B

**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.

   Grade B

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.
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 or by another senior doctor.  
Grade C

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

iii. Blood should not be withheld if there is a clinical indication for blood transfusion. Preparation for blood transfusion should be made for all patients undergoing surgery for colorectal cancer except where an individual patient refuses.  

Grade C

iv. Mechanical bowel preparation prior to surgery is recommended.  

Grade C

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

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.  
Grade B

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

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 5cm 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.  
Grade B

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 low anterior resection and total mesorectal excision the judicious use of a temporary defunctioning stoma is recommended, and the formation of a colonic pouch may be considered.  

Grade C

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

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 1cm 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.  
Grade B

vii. Local excision for cure in rectal cancer should be restricted to pT1 cancers with well or moderate differentiation less than 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.  
Grade B

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 multi-centre trials.  
Grade B
Record Keeping
i. It is recommended that detailed clinical notes and operative findings and procedures are kept for all colorectal cancer patients.
ii. Sound record-keeping facilitates accurate audit in a colorectal unit.
iii. Accurate record keeping promotes good quality clinical research

Emergency Treatment
i. Emergency surgery should be carried out during daytime hours as far as possible, by experienced surgeons and anaesthetists.
   Grade C
ii. For patients presenting with obstruction, steps should be taken to exclude pseudo-obstruction before operation.
   Grade B
iii. Stoma formation should be carried out in the patient's interests only, and not as a result of lack of experienced surgical staff.
   Grade B

Adjuvant Therapy
i. Patients with Dukes’ C colon cancer should be considered for adjuvant chemotherapy.
   Grade A
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.
   Grade B
vi. Systemic chemotherapy should only be administered by clinical staff with appropriate training and experience, according to Irish Oncology guidelines.
   Grade C
vii. Patients with a T3 rectal cancer should be considered for entry into clinical trials of pre-operative radiotherapy.
   Grade C
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.
   Grade B
ix. In patients with rectal cancer pre-operative radiotherapy using short course (25 Gray (Gy) in 5 fractions in one week) or longer course (40-45 Gy in 20-25 fractions over 4-5 weeks) are both acceptable.
   Grade A
x. In patients with rectal cancer who have not had pre-operative radiotherapy, post-operative radiotherapy and chemotherapy should be selected where there are well-established predictors of high-risk (e.g. evidence of tumour at the circumferential resection margins).
   Grade A
xi. In all 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.
   Grade B
xii. A planned radiotherapy volume using three or four fields is recommended for rectal cancers as this results in less morbidity and mortality.
   Grade B
xiii. Patients with potentially operable rectal cancer should always be considered for entry into trials of adjuvant radiotherapy.
   Grade B
Treatment of Advanced Disease

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

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 considered for palliative chemotherapy as soon as the diagnosis of metastatic disease is made, but this may not be appropriate for all patients.
   Grade A

iv. Chemotherapy for metastatic colorectal cancer should only be given after discussion at a Multidisciplinary Team meeting.
   Grade C

v. Entry into clinical trials evaluating the benefits of novel therapeutic regimens in colorectal cancer should be encouraged. All trials involving surgery either at diagnostic or therapeutic stage should have a surgeon as a principal investigator.

vi. Palliative treatment should be 5-fluorouracil (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.
   Grade A

vii. Hepatic arterial infusional chemotherapy remains of unproven benefit.
   Grade A

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

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

x. All clinicians who deal with colorectal cancer should have good communication skills and experience in the control of pain and other cancer symptoms.
   Grade C

xi. Patients with colorectal cancer should be offered the opportunity to ask questions and to have important information repeated. Provision of information should be an essential part of every consultation.
   Grade C

Outcomes

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

Hospitals treating colorectal cancer should carefully audit the outcome of treatment and achieve:

i. An operative mortality of less than 25% for emergency surgery and less than 7% for elective surgery with colorectal cancer.
   Grade B

ii. Wound infection rates after elective surgery for colorectal cancer in the region of 10% or even lower.
   Grade A

iii. 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.
   Grade B

iv. Local recurrence rates after curative resection for rectal cancers in the region of 10% or even lower within 2 years of operation.
   Grade B

Intensive care and high dependency care are essential parts of peri-operative colorectal cancer care and should be available in hospitals undertaking colorectal cancer surgery.
Follow-Up

i. There is no evidence that intensive follow up for the detection of recurrent disease improves survival. However, liver imaging may be offered to asymptomatic patients during the first two post-operative years for the purpose of detecting operable liver metastases.
   Grade B

ii. There is no evidence that colonoscopic follow-up improves survival, but it has been shown to yield adenomatous polyps and metachronous cancers. If such a policy is pursued, it is recommended that a “clean” colon should be examined by colonoscopy at 3-5 year intervals.
   Grade B

iii. Audit and follow-up are necessary to determine post-operative mortality, anastomotic leak rates, colostomy rates and 5-year survival. This should be regarded as routine.
   Grade C

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

Pathology

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

ii. Pathology reports (See Appendix 2) should contain information on all of the data items contained in the Joint National Guidelines Minimum Data Set for Colorectal Cancer Histopathology Reports.
   Grade C

iii. Pathology laboratories should store stained histology slides for a minimum of 20 years, and tissue blocks from specimens indefinitely, in order to facilitate future case review, clinical audit, and research.
   Grade B

iv. Pathological examination of colorectal cancer specimens should be carried out in laboratories which attain high technical standards and which participate in external quality assessment schemes and regular audit of technical procedures and diagnosis.
   Grade B
INVESTIGATIONS

Screening in high risk groups

A small percentage (about 10%) of patients have a genetic predisposition for colorectal cancer. Approximately one tenth of these (1%) are ‘inherited cancers’, as occurs in familial adenomatous polyposis (FAP). The remainder are ‘familial cancers’ as exemplified by hereditary non polyposis colorectal cancer (HNPCC). HNPCC is an autosomal dominant condition characterised by:

i. at least three relatives with a confirmed colorectal cancer (one of whom should be a first degree relative of the other two);

ii. at least two consecutive generations should be affected; and

iii. colorectal cancer should be diagnosed under the age of 50 years of age in one affected member.

Various clinical subtypes exist, with or without extracolonic tumours (e.g. endometrium, skin).

Until genetic screening is established, colonoscopy will form the mainstay of screening of patients and their relatives and should probably be carried out every 2-3 years. Screening should commence in the 3rd decade for those at risk of HNPCC and in the 2nd decade for those at risk of FAP.

In the majority of patients presenting with colorectal cancer who have a family history of the disease, and in many families presenting to genetic clinics, the degree of risk to relatives and the nature of the underlying genetic defect is unclear. There is little evidence as to the value of screening relatives of affected individuals in these circumstances.

Family screening should be offered to first degree relatives when FAP or HNPCC is diagnosed. Total colonoscopy, or double contrast barium enema and sigmoidoscopy, should be offered and started in the second decade when FAP is diagnosed, and in the third decade when HNPCC is diagnosed.

Colonoscopy should be performed every 2-3 years taking into account the individual’s general physical condition and compliance. For those at risk of FAP more frequent (every 1-3 years) sigmoidoscopic screening should also be considered. Grade C, level IV

Patients with FAP should be offered total colectomy with ileorectal anastomosis or proctocolectomy with restorative ileoanal pouch reconstruction once colonic polyps have developed.

Subsequent management should include lifelong surveillance of any residual rectal stump and regular upper gastrointestinal tract endoscopy to detect adenomata and early malignant change.

Grade B, level III

Primary Care

It is estimated that a general practitioner will see 3 new gastro-intestinal cancers per 10,000 consultations. There are usually significant delays (19 to 29 weeks) from the onset of symptoms to surgical treatment. Almost one-third of patients with colorectal cancer undergoing surgery are admitted as emergencies and approximately 45% are over 75 years of age.

Patients with significant and persistent (4 weeks) new symptoms (e.g. change in bowel habit, rectal bleeding, passage of mucus, abdominal pain), particularly in middle-aged and older patients, and/or those with any significant clinical abnormality (e.g. abdominal mass, tenderness, rectal lesion) need an urgent referral for assessment. Similarly, patients with clinical features of anemia and haematological evidence of iron deficiency anemia, in the absence of any overt cause, should be referred to exclude occult colon cancer. For the majority of patients referral should be directly to a specialist with an interest in colorectal cancer.

All patients attending a general practitioner with new, significant and persistent (4 weeks or more) colorectal symptoms should have a careful history (including family history) taken and undergo a physical, including rectal, examination.

If any significant clinical abnormality is found, urgent referral should be made to a specialist with an interest in colorectal cancer for investigation within 2-4 weeks.

If the patient is under 45 years age but in a high risk group, whether or not there is any significant clinical abnormality, urgent (2-4 weeks) referral should be made.

If the patient is over 45 years of age with colorectal symptoms that are not explained by the general practitioner assessment, urgent referral should be made.

If the patient is less than 45 years and does not belong to a high risk group, there is no relevant past family or medical history and no clinical abnormality, review within a period of four weeks should be carried out as appropriate, depending on the severity of the symptoms, their persistence or recurrence. If symptoms persist at review, referral should be made.

Grade C, level IV
High risk groups and low risk groups are defined as follows.

**High risk criteria**

Only patients with new and persistent symptoms listed below should be referred to the fast-track system. These criteria should include 80-90% of all colorectal cancers presenting to outpatient clinics.

**Low Risk Criteria**

The risk of cancer is never zero even in patients with no symptoms as shown by screening studies. Some cancers will be diagnosed incidentally in patients being investigated for symptoms of benign disease. Others will have symptomatic cancers, which develop in patients already symptomatic from functional bowel disease or haemorrhoids. This means that all low-risk patients with persistent symptoms not responding to treatment or recurring after stopping treatment, should be referred to routine clinics.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Age Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal bleeding with a change in bowel habit</td>
<td>All ages</td>
</tr>
<tr>
<td>to increased frequency of defaecation and/or</td>
<td></td>
</tr>
<tr>
<td>looser stools and persistent for at least 6</td>
<td></td>
</tr>
<tr>
<td>weeks</td>
<td></td>
</tr>
<tr>
<td>Rectal bleeding persistently without anal</td>
<td>Over 60 years</td>
</tr>
<tr>
<td>symptoms</td>
<td></td>
</tr>
<tr>
<td>Change in bowel habit to increased frequency</td>
<td>Over 60 years</td>
</tr>
<tr>
<td>of defaecation and/or looser stools persistent</td>
<td></td>
</tr>
<tr>
<td>for at least 6 weeks</td>
<td></td>
</tr>
<tr>
<td>Patients with an easily palpable right iliac</td>
<td>All ages</td>
</tr>
<tr>
<td>fossa mass</td>
<td></td>
</tr>
<tr>
<td>Patients with an easily palpable rectal mass</td>
<td>All ages</td>
</tr>
<tr>
<td>Patients with an unexplained iron deficiency</td>
<td>All ages</td>
</tr>
<tr>
<td>anaemia: below 11 grams in men</td>
<td>All ages</td>
</tr>
<tr>
<td>below 10 grams in women</td>
<td>Post-menopausal</td>
</tr>
</tbody>
</table>

Criteria indicating patients at very low risk of cancer are:

- Rectal bleeding with anal symptoms
- Rectal bleeding with an obvious external visible cause such as prolapsed piles

It is recommended that in order to reduce patient anxiety surgeons should expect to achieve average waiting times of four weeks or less between making a diagnosis of colorectal cancer and treatment. This requires adequate access to appropriate facilities at the referral centre.

It is axiomatic that doctors who decide on therapeutic strategy and implement that strategy should have sufficient experience in the management of colorectal cancer.

Thus, it is not yet possible to specify a minimum number of operations which should be performed each year. It is recommended that colorectal cancer should be treated by surgeons with appropriate training and experience.
ASSESSMENT OF THE COLON

A complete examination of the large bowel should be undertaken by either:

a. total colonoscopy

or

b. adequate endoscopic visualisation of the rectum plus a double contrast barium enema.

It must be accepted however, that both investigations may vary in quality, and the choice between colonoscopy and barium enema for total colonic examination will depend on local availability and expertise. Histology should be considered mandatory in a rectal cancer which might result either in permanent stoma formation or an ultra-low anterior resection, or when pre-operative radiotherapy is being considered.

Regardless of whether colonoscopy or barium enema is employed, certain minimum levels of quality should be achieved with both of these investigations.

Colonoscopy should usually be done as a day-case procedure after full bowel preparation, and the endoscopist should be prepared to biopsy or remove appropriate lesions (i.e. areas of inflammation, sessile tumours and polyps). The patient should be warned of possible discomfort and the risks of perforation and bleeding. If sedation is used, care should be taken to avoid complications and guidelines have been issued.

It is important that the endoscopist can recognise when a total colonoscopy has been achieved, and this can only be guaranteed when the terminal ileum has been unequivocally identified (Cotton & Williams 1990. IV). This is generally not practicable. A printed picture of the ileo-caecal valve may be a reasonable compromise.

Barium enemas should all now be double contrast examinations (Laufer 1979. III), and should be carried out by, or under the supervision of, a radiologist experienced in the performance and interpretation of this technique. Every attempt should be made to examine the whole of the large bowel and particular attention should be paid to the sigmoid colon and caecum, as failure to display this area properly can lead to lesions being missed (Lauer et al 1965. III). In addition, inexperience combined with failure to distend the caecum can produce misleading appearances which can be misinterpreted as malignancy.

Non-committal reporting of barium enemas by the responsible radiologist can be a problem for the clinician, and may be due to lack of experience in the interpretation of films, a technically inadequate examination or medico-legal concerns. For a barium enema to be of use in reaching a clinical decision, a firm opinion as to the most likely process giving rise to the radiological appearances should be given on the report.

Despite good radiological technique, it may be impossible to be sure of excluding neoplasia with any certainty, particularly where there is severe diverticular disease of the sigmoid colon. In such cases, supplementary endoscopy either in the form of flexible sigmoidoscopy or colonoscopy is mandatory.

In summary, it is recommended that patients with suspicious symptoms or a proven colorectal cancer be investigated with either endoscopic visualisation of the whole rectum plus a high quality double contrast barium enema or total colonoscopy. Supplementary flexible endoscopy should be carried out where it is impossible with any certainty to exclude neoplasia on barium enema.

Grade B

Histology should be obtained from all rectal tumours.

Grade B

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

Grade B

Assessment of the Rectum: Local extension and peri-rectal lymph nodes

Where possible magnetic resonance imaging (MRI) rather than Computed Tomography (CT) should be undertaken when rectal cancers are being considered for resection as it is important to determine whether adjacent organs are involved (Padhani 1999. III, Kumar & Scholefield 2000. III, Heriot et al 1999. III). The degree of local extension may determine whether a curative excision can be achieved, and whether pre-operative adjuvant radiotherapy should be given (Brown et al 1999. IIb) and (Beets-Tan et al 2001. IIb).

In patients with rectal cancer where local excision is being considered (T1 lesions), staging by endorectal ultrasound scanning to determine the depth of penetration is recommended.
MRI can identify small peri-rectal lymph nodes by virtue of their morphology (Brown et al 1999a. IIb). The use of size criteria alone for defining lymph node involvement is unreliable and must be used with great caution. Lymph nodes greater than 1cm in diameter are more likely to be involved (Padhani 1999. III, Kumar & Scholefield 2000. III, Heriot et al 1999. III). The majority of involved lymph nodes in colorectal cancer specimens measure less than 5mm (Dworak 1991. III) and there is currently no method for differentiating these from reactive nodes.

The value of MRI lies not so much in early T1-T2 staging (where rectal endosonography is currently more accurate) but in assessing the tumour extent (particularly in the lateral and anterior planes). Involvement of the mesorectum is easily demonstrated on MRI. A histological clearance of less than 1mm may be safely predicted when this appears to be less than 5mm on MRI (Beets Tan, 2001. III). The high soft tissue differentiation, multiplanar imaging and improved resolution of current scanners dictate that MRI is fast becoming the investigation of choice for rectal cancer regardless of position (Brown 1999. IIb).

Transrectal endosonography is recommended where clinical examination suggests that local excision may be feasible.
Pre-operative assessment is carried out to confirm the diagnosis. All rectal cancers should be histologically proven. It is important to determine extent and spread and distant spread (in particular hepatic metastases by ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI)) and establish the presence or absence of synchronous lesions (4-5%), using colonoscopy and/or double contrast barium enema (DCBE) and sigmoidoscopy. Pre-operative staging (extent of local spread) of distal rectal cancers may be carried out using CT, MRI or endoluminal ultrasound. Results of these staging procedures should be documented clearly in the notes.

Where possible histological confirmation of diagnosis should be obtained prior to surgery, particularly in rectal cancer.

In rectal cancer, distance from the anal verge, extent of circumferential involvement and degree of fixity should be noted.

The large bowel should be assessed either by colonoscopy or a combination of rigid/flexible sigmoidoscopy and DCBE.

A chest radiograph and liver imaging should be performed to determine tumour dissemination.

COMMUNICATION WITH PATIENTS

Most patients with cancer wish to have information about their condition and proposed management, and to be involved in decisions about their treatment options. This should be readily available in clear and readable publications as well as through direct patient contact. There should not be undue delay in imparting the results of investigations. Breaking ‘bad news’ is initially likely to be done by the surgeon. It is important to establish what patients know, fear and want to know. Discussion of surgical treatment may need to address stoma formation and possible difficulties with sexual, urinary and rectal function.

Patients should be given the information they wish over a period of time.

Coming to terms with the diagnosis and treatment takes time and the information which patients wish or need may vary during this period.

Prior to carrying out investigations to establish the diagnosis of colorectal cancer patients should be provided with relevant information about the procedures to be used.

Consideration should be given to increasing patient acceptability of the different investigative procedures.

Patients should have the opportunity to discuss treatment options and be appraised of the likely consequences of different procedures (e.g. stoma formation). They should be involved in decision-making to the extent they wish.

Grade B, levels IIb & III

PREPARATION FOR SURGERY

The risks of surgery and possible morbidity (e.g. impotence in males), likelihood and effects of stoma formation need to be discussed with the patient. Bowel preparation and prophylaxis for deep vein thrombosis (DVT) and sepsis are all initiated in the perioperative period.

All elective patients should have mechanical bowel preparation and antibiotic prophylaxis.

Grade A, level IB

All elective patients should have DVT prophylaxis.

Patients requiring formation of a stoma should be seen by a stoma therapist prior to surgery and those undergoing pelvic dissection should be informed about possible bladder and sexual dysfunction following surgery.

Grade C level IV

In general terms, surgery for colorectal cancer should be avoided if the hazards are deemed to outweigh the potential benefits, i.e. in the patient who is medically unfit for surgery or who has advanced disease which is not amenable to surgical therapy. As the decision not to operate depends on highly individual factors it is impossible to provide such guidelines, but in making such a decision it is important to involve the patient and/or close relatives so that the underlying reasoning is clear and acceptable to all concerned.

Given that surgery is to proceed, there are certain fundamental aspects of preparation which deserve consideration, and these are listed below:

a. Informed consent.
b. Anorectal manometry.
c. Preparation for stoma formation.
d. Cross-matching of blood.
e. Bowel preparation.
f. Thrombo-embolism prophylaxis.
g. Antibiotic infection prophylaxis.
a. **Informed consent**

All patients undergoing surgery for colorectal cancer should give informed consent unless they are unable to do so in which case it may be necessary to obtain consent from a relative. The consent should be obtained by a doctor who fully understands the nature of the operation, and is able to answer any pertinent questions the patient or relatives may have. The risks of death and morbidity must be carefully explained; in particular, the likelihood of requiring a stoma and developing urinary problems and impotence after rectal surgery should be discussed. In addition, patients should be warned of the increased stool frequency often experienced after right hemicolectomy or subtotal colectomy, and the risk of a poor functional result after a low anterior resection should be explained.

*Grade C*

b. **Anorectal manometry**

It is desirable that patients proposed for low anterior resection, particularly females, undergo evaluation of anal sphincter function by manometry pre-operatively.

*Grade C*

c. **Preparation for stoma formation**

If a patient may require a stoma the nature and consequences of this should be carefully explained. It is also important that the site of the stoma be marked prior to surgery to ensure optimum fitting of the appliance (Devlin 1982. IV). The patient should be seen by a stoma therapist prior to surgery (Saunders 1976. IV) and the referral should be made at the earliest possible opportunity to allow adequate time for preparation. It is recognised that this may not be possible in some emergency situations and in this case the stoma site should be marked by an experienced surgeon.

d. **Cross-matching of blood**

There is evidence that blood transfusion may increase the likelihood of recurrence of colorectal cancer, and immunological mechanisms have been invoked (Burrows & Tartter 1982. III). This has not been unequivocally proven, however (Bentzen et al 1990. III) and a trial comparing the use of autologous and allogeneic blood in patients undergoing resection of colorectal cancer showed no difference in prognosis (Busch et al 1993. Ib). It is recommended that blood should not be withheld if there is a clinical indication to give it, and preparation for blood transfusion should be made in all patients undergoing surgery for colorectal cancer except where an individual patient refuses. For an uncomplicated right hemicolectomy, blood grouping and saving of serum may be sufficient but formal cross-matching is recommended for more extensive operations, especially rectal resections (Harrison et al 1992. Ib. A)

*Grade A*

e. **Bowel preparation**

Mechanical bowel preparation is generally regarded as mandatory before elective colorectal surgery, and all surgeons in Trent/Wales (Ib) used some form of such preparation. However, not all surgeons hold this view (Irving et al 1987. III) and there has been a recent randomised study which showed no benefit from sodium picosulphate preparation when compared with no preparation in left colonic or rectal resection (Burke et al 1994. IIb). No definite recommendations can be given therefore, but the consensus view is still in favour of mechanical bowel preparation.

*Grade C*
f. Thrombo-embolism prophylaxis

Patients undergoing surgery for colorectal cancer are at risk of deep vein thrombosis (DVT) and pulmonary embolism (PE) (Salzman and Davies 1980. III). The most widely studied prophylactic measure against these complications is the use of subcutaneous heparin, and although there have been no studies confined to patients with colorectal cancer, a meta-analysis of appropriate trials has indicated that rates of DVT, PE and death from PE can all be significantly reduced in general surgical patients (Collins et al 1988. Ia). Low molecular weight heparin (LMWH) has attracted recent attention and although a large randomised trial in patients undergoing abdominal surgery has shown it to be of similar efficacy to standard heparin, bleeding-related complications were less common (Kakkar et al 1993. Ib). Other measures which can be taken are intravenous dextran, the use of intermittent pneumatic compression devices and the use of graduated stockings. Dextran does not appear to be as effective as heparin (Salzman & Davies 1980. III), but there has been one trial indicating that intermittent compression is equivalent to heparin in reducing the incidence of DVT (Persson et al 1991. Ib). Graduated stockings alone are less effective than other measures (Persson et al 1991. Ib). It is recommended that either of these strategies should be employed in surgery for colorectal cancer unless there is a specific contraindication.

G. Antibiotic prophylaxis

There is now very good evidence that prophylactic administration of antibiotics can decrease morbidity, shorten hospital stay and reduce infection-related costs after general surgical operations (Page et al 1993. Ib). Various antibiotics and combinations of antibiotics have been shown to be effective, and in Trent/Wales the most favoured regime was a combination of cephalosporin and metronidazole. Gentamicin with metronidazole and augmentin alone was also used. If intravenous cephalosporin and metronidazole are used, there is evidence from a randomised, controlled trial that a single dose given immediately before operation is as efficacious as a three-dose regimen in preventing wound infection (Rowe Jones et al 1990. Ib).

**Grade A**

It is therefore recommended that all patients undergoing surgery for colorectal cancer have antibiotic prophylaxis. It is impossible to be dogmatic as regards the precise regimen, but a single dose of appropriate intravenous antibiotics appears to be effective.

**Grade A**
SURGICAL PRINCIPLES

The surgery of colorectal cancer is based on oncological and anatomical principles.

- Colorectal cancer spreads in a predictable manner to the regional draining lymph nodes. Locoregional control is best achieved by surgery and is essential for satisfactory outcome.

- Survival after ‘curative resection’ is related to the stage of the disease – depth of tumour penetration and/or the presence of lymph node metastases (biological markers of disseminated disease).

The fixity of the primary tumour will determine resectability and the extent of spread the ultimate survival. Tethering or local infiltration is not necessarily a contraindication for radical surgery.

SURGICAL TECHNIQUE

a. Resection

There is little controversy regarding the resection of colonic tumours. There has been a tendency to move away from segmental resections for tumours of the transverse colon and splenic flexure in favour of extended right hemicolectomy and although there has been no randomised trials, this is widely accepted as being safer. The no-touch isolation technique in which the vascular supply to a tumour is divided before the tumour is handled has been tested in a randomised controlled trial and shown to confer no significant advantage (Wiggers et al 1988. Ib).

In rectal cancer, however, resection technique is of great importance.

In 1999 representatives of the American Society of Colon and Rectal Surgeons and the Association of Coloproctology met with Australian Societies to define the rectum and the procedures used to treat cancer of the rectum. As the treatment of rectal cancer differs from the treatment of colorectal cancer in some important respects, particularly in the areas of surgery and radiotherapy, it is important to have a clear anatomical definition of the rectum. Strictly, the rectum is that part of the large bowel distal to the sigmoid colon and its upper limit is indicated by the end of the sigmoid mesocolon. Standard anatomical texts put this at the level of the 3rd sacral vertebra (Williams & Warwick 1980. Iv). This is not particularly helpful pre-operatively, however, and it has been agreed by the Expert Advisory Committee of the Association of Coloproctology of Great Britain and Ireland, that any tumour for which the distal margin is seen at 15cm or less from the anal verge using a rigid sigmoidoscope should be classified as rectal.

Grade C

Although most local recurrences after resection of colonic cancer occur together with disseminated disease (Abulafi & Williams 1994. III), local recurrences after rectal excision are often isolated, and reported rates of recurrence after curative rectal resection varies from 2.6% (Karanjia et al 1990. III) to 32% (Hurst et al 1982. III) individual surgeons vary greatly in this respect, with two studies showing a variation of 0 to 21% in recurrence rate among participating surgeons (Phillips et al 1984. IIb, McArdle & Hole 1990. IIb).

The reason for this variation is not entirely clear, although there is good evidence that surgical technique is a critical factor. Complete excision of the mesorectum is associated with a low rate of local recurrence (Heald et al 1982, Heald & Ryall 1986. III), and a pathology study has shown that distal mesorectal spread often extends further than intramural spread, with secondaries being found up to 3cm distal to the primary cancer (Scott et al 1995. IIb). Evidence from Europe has shown that education of established surgeons can lead to improvements in technique which result in a reduction in local recurrence and a reduction in the abdomino-perineal resection rate (M artling et al, 2000. IIa). It is recommended that lymph node clearance should extend for 5cm beyond the distal margin of a rectal cancer, and in tumours of the middle and lower thirds of the rectum the only practical way of achieving this is by total mesorectal excision. When this is done, care must be taken to preserve the autonomic nerves and plexuses on which sexual potency and bladder function depend.

There was a concern that a tendency to avoid abdomino-perineal excision (APER) in favour of anterior resection might account for high local recurrence rates (Phillips et al 1984. IIb, Neville et al 1987. III), but several series show no difference between the operations (Dixon et al 1991. III, M orson et al 1963. III, Patel et al 1977. III, Williams et al 1984. III, Holm et al 1995. IIa). Randomised controlled studies comparing APER and anterior resection are not available, but where differences in local recurrence rates for the two operations exist it has been suggested that they may be explained by the plane of dissection being nearer the rectum in anterior resection – a problem which can be avoided by total mesorectal excision (Heald 1988. III).
Perforation of the tumour during resection is also an important factor, as it is associated with local recurrence (Phillips et al 1984. IIb, Patel et al 1977. III, Zirngibil et al 1990. III). This phenomenon appears to be independent of tumour stage or fixity (Wiggers et al 1988. IIb). In summary, it is recommended that total mesorectal excision be performed for tumours in the lower two-thirds of the rectum, either as part of a low anterior resection or an APER. In tumours of the upper rectum the mesorectum should be divided no less than 5cm 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.

Grade B

b. Anastomosis

Anastomotic dehiscence is a major source of operative morbidity and mortality after resection for colorectal cancer. Its rate is known to vary greatly from one surgeon to another and it is known to be more common after anterior resection of the rectum than after colonic resection (Fielding et al 1980. IIb, McArdle & Hole 1991. IIb). Although the best published results involved the use of a single layer interrupted serosubmucosal technique (Matheson et al 1985. III, Carty et al 1991. III), this may have been due to the skill of the surgeon and/or case selection rather than the technique itself. Stapling methods have been compared with manual suturing techniques in several randomised trials (Beart et al 1981. Ib, Brennan et al 1982. Ib, Everett et al 1986. Ib, McGinn et al 1985. Ib, West of Scotland and Highland Anastomosis Group 1991. Ib), and overall there is no observable difference in leak rates with colorectal surgery.

Stapling has, however, made the performance of the ultra-low anastomosis after anterior resection much more feasible. As it is known that distal intramural spread rarely extends more than 1cm beyond the palpable edge of the tumour (Williams et al 1983. IIb), the ability to obtain distal clearance of 1cm of more should therefore allow an anterior resection which is oncologically sound so long as it is combined with total mesorectal excision (vide supra).

Unfortunately, such anastomoses are associated with a high leakage rate, even when the same surgeon has very acceptable leakage rates from other types of resection (Karanjia et al 1994. III). However, there is evidence that the defunctioning stoma can ameliorate the consequences of leakage, decreasing the risk of death and need for a permanent stoma (Karanjia et al 1994. III).

Several trials have compared a defunctioning ileostomy with defunctioning colostomy with mixed outcomes. There are advantages and disadvantages for each type of stoma. The balance of evidence slightly favours a defunctioning ileostomy over transverse colostomy (Williams et al 1996. Ib, Gooszen et al 2000. Ib).

Other problems associated with the low anastomosis are functional; many patients have urgency and increased frequency action (Williams & Johnston 1983. Ib) after low anterior resection, and this has been attributed to loss of the reservoir function of the rectum. Formation of a colonic j-pouch may overcome this difficulty, and several studies now attest to the efficacy of this procedure (Seow-Choen & Goh 1995. Ib, Mortensen et al 1995. IIb). Finally, as large numbers of viable tumour cells can be demonstrated in the lumen of the colon at the time of operation (Umpleby et al 1984. IIb) the use of cytocidal washout prior to anastomosis is generally accepted as a sensible precaution to reduce the risk of anastomotic recurrence.

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 de-functioning stoma is recommended and the formation of a colonic pouch should be considered.

Grade B

Cytocidal washout of the rectal stump prior to anastomosis should be used.
RATES OF PERMANENT STOMA FORMATION

The lowest rate of permanent stoma formation for rectal cancer in the literature is 9% in a unit routinely employing a stapled anastomotic technique for low anterior resection (Karanjia et al 1994. III). Other specialist units have reported rates of 10% (Williams et al 1985. III) and 19% (M atheson et al 1985. III). However, in a report from the West Midlands Cancer Registry the proportion of rectal tumours treated by abdomino-perineal excision (APER) between 1957 and 1981 was 68% (Allum et al 1994. IIb). In the Large Bowel Cancer Project, 56% of patients undergoing curative resection of the rectum had an APER (Phillips et al 1984. IIb) in the Trent/Wales audit the figure was 37% (IIb). It is not clear why these differences exist. There seems to be a general reduction in the proportion of rectal cancer treated by APER with the passage of time, but there is still marked individual variation. Case-mix and an increasingly elderly population may explain some of this variation. As staged above, distal intramural spread rarely extends more than 1cm beyond the palpable edge of the tumour (Williams et al 1983. IIb), and it is possible that failure to recognise this finding results in an inappropriate number of APERs being performed by non-specialist surgeons.

In low rectal cancers, a surgeon may be unsure of the feasibility of anterior resection. In such a case, it is strongly recommended that a second opinion from an experienced rectal surgeon is obtained (IV).

It is difficult to determine what the ideal ratio of anterior resection to APER should be, but it is recommended that the overall proportion of rectal cancers treated by APER should be less than 40%. Depending on stage of disease at presentation and if distal clearance of 1cm 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. Grade B

LOCAL EXCISION

Occasionally small pT1 rectal cancers are technically suitable for a local excision transanally and some polyps excised by snare diathermy will contain invasive carcinoma. Careful studies have shown that cancers fulfilling the histological criteria can be regarded as cured by a local excision (Whiteway et al 1985. IIib) whereas pT2 tumours are associated with a higher risk of lymph node involvement and of local recurrence without further treatment (Graham et al 1990. IIb).

Local excision of rectal adenomas using transanal endoscopic microsurgery has become popular over the last five years. Published data suggest that this is at least as good as traditional transanal resection and may offer advantages for polyps in the middle third of the rectum (Steele et al 1996. IIb).

In summary local excision for cure in rectal cancer should be restricted to pT1 cancers with well-or moderate-differentiation and less than 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. Grade B

The anastomotic leak rate should be less than 8% for anterior and less than 4% for other types of resection.

Operative mortality for colorectal surgery should be less than 5% for elective resections and below 25% for emergency procedures. B level IIb & III
Emergency Surgery

In population-based studies, approximately 30% of colorectal cancers present as emergencies - most with obstruction - a few with perforation or bleeding. Patients presenting as emergencies tend to be older, have concomitant disease, a more extensive malignant process, spend longer in hospital and are more likely to have a permanent stoma. Post-operative morbidity (19%) and mortality (8%) is higher and survival poorer (30% at five years), compared with patients presenting electively.

A clinical diagnosis of obstruction should be confirmed by a plain abdominal radiograph and a water soluble contrast enema or endoscopy to exclude pseudo-obstruction (Koruth et al 1985. IIb).

In the absence of perforation or life-threatening bleeding, operation for large bowel obstruction can be regarded as an urgent rather than emergency procedure, and every effort should be made to operate during the day with experienced surgeons and anaesthetists. An exception to this may be the situation where the ileo-caecal valve is competent, and the caecum is in danger of perforation.

The patient with obstruction should be carefully prepared for surgery, with adequate fluid resuscitation monitored by blood pressure and urine output measurements at the very least. Antibiotics and DVT prophylaxis should be administered. Centres undertaking this type of surgery should have an intensive care unit or high-dependency unit, and these should be used for post-operative, and, occasionally, pre-operative care when appropriate.

The type of surgery which should be undertaken for large bowel obstruction is to some extent controversial, but broad guidelines can be given. For right-sided lesions, primary resection and ileocolic anastomosis is usually feasible (Deans et al 1994. III). For left-sided lesions, the use of simple defunctioning colostomy is not generally favoured except in extreme circumstances where the patient is not considered fit for a more extensive procedure. Rather, immediate resection of the obstructing cancer should be carried out, either as a Hartmann’s procedure with end colostomy, or, when conditions are favourable, as a primary resection with anastomosis (Deans et al 1994. III). If the latter option is chosen, this can be done either as a segmental resection with on-table colonic lavage (Koruth et al 1985. IIb), or as a subtotal colectomy with ileorectal anastomosis (Dorudi et al 1990. III). A recent randomised trial has indicated that these two procedures are roughly equivalent, although long term bowel habit is better with the former (SCOTIA 1994. Ib).

In summary, emergency surgery should be carried out during daytime hours as far as possible, by experienced surgeons and anaesthetists.

Grade C

In patients presenting with obstruction, measures should be taken to exclude pseudo-obstruction before operation and stoma formation should be carried out in the patient’s interest only - not as a result of lack of experienced surgical staff. The overall mortality for emergency/urgent surgery should be less than 25%.
Adjuvant Chemotherapy

COLON CANCER

There is evidence that in patients who have had a curative resection for Dukes’ C carcinoma of the colon, adjuvant systemic chemotherapy has a significant impact on population survival (Moertel et al 1995. ib, IMPACT, 1995. ib, Zaniboni et al 1998. ib). Two recent meta-analyses have been performed. In the colorectal cancer collaborative group meta-analysis 12,000 patients in 33 randomised controlled trials were included. This concluded that prolonged use of SFU based regimens for greater than three months can improve survival in colorectal cancer. The size of the benefit for Dukes’ C colon cancer was estimated at about 6% (range 2-10%) (NHSE Executive 1997. IV). A different meta-analysis of 39 trials indicates the size of the benefit is about 5% absolute improvement in 5-year survival in those receiving chemotherapy (Dube et al 1997. Ia). The side-effects of the treatment have been shown to cause only minor psychological distress (Norum 1997. Ib). However, in individual patients the survival benefit is small and there will be some patients for whom systemic chemotherapy is inappropriate in view of age or comorbidity.

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

Grade A

In node-negative colon cancer (Dukes’ B), there remains uncertainty of the value of adjuvant chemotherapy. A pooled analysis of 1116 patients with B2 (Astler Coller) colon cancer randomised to chemotherapy versus observation showed no significant improvement in overall survival (HR 0.86, CI 0.72-1.07), 5-year survivals were 80% for control and 82% for chemotherapy patients, (IMPACT B2 1999. Ib). In contrast, a grouped analysis of the National Surgical Adjuvant Bowel Project (NSABP) trials C-01-04, which included 1565 Dukes’ B patients, concluded that a 30% proportional reduction in mortality resulted from the use of chemotherapy (M amounas et al 1999. Ia) consistent with a 5% absolute reduction in death at 5-years. This data together suggests a small (perhaps 2-5%) absolute increase in survival for Dukes’ B cancer patients for adjuvant chemotherapy. Given the toxicity of treatment, this is inadequate justification for routine use of chemotherapy in these patients. The size of benefit and its balance with toxicity needs further clarification in clinical trials.

Some poor risk features can be identified in Dukes’ B cancers (serosal involvement, perforated tumours, extramural vascular invasion, poorly-differentiated histology, and in rectal cancer, involvement of the circumferential resection margin). These patients have as poor a prognosis as node-positive patients. Individual patients should be assessed for their specific risk on this basis and counselled regarding the relative lack of evidence to support adjuvant chemotherapy. However, it may be appropriate to offer chemotherapy to such patients on the basis of the proportionate reduction in risk observed in the clinical trials.

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

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

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

RECTAL CANCER

The impact of adjuvant chemotherapy alone has been difficult to identify because many trials have assessed the combination of chemotherapy and radiotherapy together. Combined chemotherapy and radiotherapy has been associated with a survival benefit in patients with Dukes’ B. Combined chemotherapy and radiotherapy has been associated with a survival benefit in patients with Dukes’ B and C rectal cancer, when compared with radiotherapy alone (Krook et al 1991. Ib). The meta-analysis of adjuvant chemotherapy of colorectal cancer (Dube et al 1997. Ia) showed a greater benefit for rectal cancer than for colon cancer (OR for mortality 0.64 95% CI 0.48 - 0.85) and estimated the size of benefit to be a 9% increase in survival for rectal cancer patients. NSABP R-20 evaluated chemotherapy with or without post-operative radiotherapy and showed no advantage for survival in adding radiotherapy to adjuvant chemotherapy (Wolmark et al 2000. Ib). Conversely, early data from the Dutch study of adjuvant therapy in rectal cancer shows no advantage for adjuvant chemotherapy and they conclude it is acceptable to continue randomising into the ongoing trial (Kapiteijn et al, 2001. Ib). However, the indirect evidence suggests that there is a benefit for post-operative adjuvant chemotherapy in rectal cancer.
No definite recommendation can be made regarding adjuvant chemotherapy for patients with Dukes' C rectal cancer. Patients may be offered either chemotherapy or be considered for clinical trials, in addition to appropriate adjuvant radiotherapy.

Grade B

ADJUVANT CHEMOTHERAPY REGIMENS

Certain statements can now be made regarding the schedule and duration of adjuvant chemotherapy if it is used. 5FU remains the basis for all adjuvant regimens. There is no advantage to high dose versus low dose folinic acid (QASAR 2000. Ib, Haller et al 1998. Ib). Levamisole does not add any further benefit in place of or in addition to folinic acid (QASAR 2000. Ib, Haller et al 1998. Ib, Wolmark et al 1998. Ib). Using a standard 5FU and folinic regimen, there is no advantage in a longer duration of therapy over 6 months (O’Connell et al 1998. Ib, Haller et al 1998. Ib), North Central Cancer Treatment Group). The toxicity of a weekly bolus 5FU and folinic acid regimen is less than the conventional 5-day fractionated regimen but in a non-randomised comparison in the QASAR trial no reduction in effectiveness was shown (QASAR, 2000. Ib).

There is no consensus beyond the above comments as to the optimum chemotherapy regimen. All 5FU based regimens are associated with a risk of toxicity, notably diarrhoea, stomatitis and leucopenia. A higher incidence of severe infections has been observed in older patients, but in spite of increased toxicity patients over 70 are equally likely to complete treatment as younger patients (Moore & Haller 1999. IIb).

Systemic chemotherapy should be administered only by clinical staff with appropriate training and experience, according to Joint Council for Clinical Oncology guidelines.

Grade C

The role of portal vein infusion (PVI) of chemotherapy remains uncertain. The meta-analysis of 4000 patients in 10 studies showed a possible survival advantage of about 5% (Liver Infusion Meta-analysis Group 1997. Ia). Since then the EORTC study has been negative (Rougier et al 1998. Ib). The UKCCX AXIS trial, which was powered to look for an overall survival benefit of 5%, showed no overall advantage for PVI 5FU in the initial analysis (James 1999. Ia). However, the estimated 5-year survival benefit in a curatively resected colon cancer group was 5% compared with 0% for curatively resected rectal cancer patients. Similar trends were seen in the meta-analysis, although at present it is not possible to say conclusively that any benefit to PVI 5FU is likely to be greater than 5%. However, molecular analysis of the curatively resected colon cancers in AXIS (a group chosen before the main AXIS results were available) showed significantly larger treatment effects in those with certain molecular markers on genetic testing, compared to those without these markers (Barratt et al 1999. IIb).

Therefore following full evaluation with large scale trials around the world the level of benefit from a one week infusion of 5FU does not indicate it should be routinely applied. However, its role is not yet finally resolved.

ADJUVANT RADIOTHERAPY

There is no established role for radiotherapy in the management of colonic carcinoma. The following applies to carcinoma of the rectum. A systemic overview has been undertaken by the colorectal cancer collaborative group and was published in the NHS executive research evidence of colorectal cancer in 1997. This includes 13 pre-operative radiotherapy studies and 8 post-operative radiotherapy studies.

PRE-OPERATIVE RADIOTHERAPY

There is consistent evidence that local recurrence of rectal cancer can be reduced by about 50% by adequate dose pre-operative radiotherapy given over one week for five weeks. The proportional reduction is not influenced by stage of tumour or fixity. In earlier trials, parallel opposed treatment fields were used, and an increased post-operative mortality from cardiovascular causes was observed. This effect was not present in other trials when improved radiotherapeutic technique employing three or four fields was used.

However, in all these trials local recurrence rates on the surgery alone arm were in the region of 20 - 30%. With improvements in surgical techniques, including total mesorectal excisions (TME), local recurrence rates are falling to less the 10% in many specialists practices. Preliminary results from the Dutch rectal cancer trial show that local recurrence rates were reduced from 8.2% with TME surgery alone to 2.4% with the addition of a one-week course of pre-operative radiotherapy (Kapiteijn et al 2001. Ia).
This was at a cost of increased perianal infection rates of 26% versus 18% in the abdomino-perineal group (n = 485, p = 0.05) and increased sexual difficulties (impotence and dyspareunia) in the irradiated group. No survival benefit is apparent at this time. There remains uncertainty as to whether this level of reduction in local recurrence rates in the absence of a survival advantage and in view of the side-effects is sufficient to use pre-operative radiotherapy in all cases of mobile rectal cancer.

**POST-OPERATIVE RADIOTHERAPY**

Meta-analysis of the post-operative radiotherapy trials also shows an effect on local recurrence, but the evidence is less consistent and the size of benefit is smaller (33% reduction SD 11%, p = 0.002) than for pre-operative radiotherapy. No effect on survival has been confirmed. The combination of chemotherapy and radiotherapy has been shown to improve survival (Krook et al 1991. III) and has been the standard American pattern of care for Dukes’ B and C rectal cancer since the 1990 National Institutes of Health consensus statement (IV). This has evolved into a combination of 5FU by infusion during radiotherapy with improvement in relapse and overall survival (O’Connell et al 1994. Ib). The question remains as to whether the improved survival was due to the synergy of 5FU and radiotherapy or simply an effect of improved chemotherapy. The NASBP R-02 trial shows that the addition of post-operative radiotherapy to chemotherapy only reduced local recurrence (13% to 8%, p=0.02) but had no effect on relapse free survival or overall survival. However, the more effective 5FU + LV chemotherapy did improve survival (Wolmark et al 2000. Ib). Thus the evidence for the benefit of adjuvant chemotherapy in rectal cancer is increasing, while the evidence for post-operative radiotherapy seems to indicate that it only has an effect on local recurrence.

The toxicity of post-operative radiotherapy is significant. There is an increased likelihood of small bowel being in the radiation field. Grade 3-4 toxicities are seen in over 70% of patients with leucopenia (23 – 33%) and diarrhoea (37 - 49%) being most frequently reported (Tepper et al 1997. Ib).

### PRE-OR POST-OPERATIVE RADIOTHERAPY

The weight of evidence is that pre-operative radiotherapy in rectal cancer has a greater effect on local recurrence than post-operative radiotherapy. Pre-operative radiotherapy also has a small effect on overall survival which is not the case for post-operative radiotherapy as distinct from chemotherapy. The additional argument for using pre-operative radiotherapy is that it results in a separation in time between pre-operative radiotherapy and the post-operative adjuvant chemotherapy and thereby a reduction in toxicity.

**Recommendations on Adjuvant Therapy**

Patients with mobile rectal cancer should be considered for entry into clinical trials of pre-operative radiotherapy.

**Grade C**

Patients 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.

**Grade B**

Pre-operative radiotherapy using short courses (25Gy in 5 fractions in one week) or longer course (40-45 Gy in 20-25 fractions over 4-5 weeks) are both acceptable.

**Grade A**

In patients who have not had pre-operative radiotherapy, post-operative radiotherapy and chemotherapy should be considered for well-established predictors or in the presence of high risk for tumour recurrence (e.g. evidence of tumour at the circumferential resection margins or radial margins of less than 1mm).

**Grade A**

Post-operative radiotherapy doses should be 40-50 Gy in 20-25 fractions or a suitable biological equivalent using a planned volume.

**Grade B**

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

**Grade B**

Patients with potentially operable rectal cancer should always be considered for entry into trials of adjuvant radiotherapy.
a. Locoregional recurrence
The three year survival of patients with locoregional recurrence of colorectal cancer is in the region of 10% (Nicholls 1986. III). There is some evidence that resection of locally recurrent disease may improve survival (Schiessel et al 1986. III, Pollard et al 1989. III), but this has not been proven in a randomised trial. Pre-operative chemoradiation prior to surgical resection of recurrent disease has increased resectability rates to 60% (Rodel et al 2000. III) but remains unproven in Phase 3 trials. A systematic review of the literature has been performed in an attempt to define the optimal radiotherapy dose for symptomatic treatment of recurrent disease (Wong et al 1998. IIa). No randomised trials were identified. Symptom relief occurred in around 70-80% of patients after radiotherapy but the median duration of relief was only 3 months with between 25 and 50% being symptom-free at 6 months in different series.

b. Inoperable primary disease
Inoperable primary disease is commonest in the rectum, and is associated with a very poor prognosis (Baigrie & Berry 1994. III). There is no evidence that palliative resection improves survival (Baigrie & Berry 1994. III). In a group of patients, clinically unresectable tumours may be rendered operable by radiotherapy (Brierley et al 1995. Ia, MRC Rectal Cancer Working Party. Ib, 1996, Marsh et al 1994. Ib), and such patients have a much better prognosis than those whose tumours remain in-situ (Pahlman & Glimelius 1992. III). Currently, trials are underway investigating the role of combined chemoradiation schedules to downstage such patients prior to attempted resection.

For patients unfit for such an approach, palliation is the objective of therapy. In the patient with an inoperable obstructing rectal cancer, a defunctioning colostomy, preferably in the form of a Hartmann's procedure, may provide useful palliation. Transanal tumour ablation using laser, electrocoagulation or resectional techniques may provide better palliation, and should be considered in these cases (Baigrie & Berry 1994. III).

Radiotherapy is useful for relieving pelvic pain (Sischy et al 1982) but side-effects can occur (Puthwala et al 1982. III) and duration of relief is relatively short-lived. Chemotherapy alone may be useful in the presence of metastatic disease but local treatments for the primary tumour may still need to be considered.

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

Grade B

c. Metastatic disease
The liver and the lung are the commonest sites for metastatic colorectal cancer. In most instances, systemic treatment is the only therapeutic option, although in a small number of cases surgical excision of metastases or in-situ destructive therapy may be feasible.

Patients with a small number of metastases in the liver or lung may benefit from appropriate resection, and with careful patient selection, hepatectomy for colorectal metastases can be associated with a 5-year survival of around 33% (Scheele et al 1990. III). The hypothesis that this approach prolongs life has not been tested by a randomised trial, but a retrospective review of 2040 patients with a metachronous isolated hepatic metastasis compared the outcome of those who did not undergo resection with those who did. After resection of hepatic metastases mean survival was 31 months (projected 5-year survival 25%) compared with those (887) who did not have resection whose mean survival was 11 months (projected 5-year survival 2%; p<0.01) (Wade et al 1996. III). Non-randomised evidence exists to support the use of pre-operative chemotherapy prior to resection in those with potentially operable liver metastases (Giachetti et al 1999. III). It is important to note that good results from this type of intervention depend on a low operative mortality, and should only be attempted where this can be achieved.
In-situ destructive therapies (interstitial laser ablation, cryotherapy, radiofrequency ablation) have been in use for over the last decade for colorectal liver metastases. In Phase 2 trials in excess of 50% of patients are alive at two years, which compares favourably with systemic chemotherapy (Seifert & Morris 1998. III, Curley et al 1999. III, Rossi et al 1996. IIb). However, patient selection for fitness to travel for invasive therapy and metastases limited to the liver influence the overall validity of this percentage. There is no Phase 3 evidence of benefit and these therapies require further evaluation.

A meta-analysis of 5 trials of palliative chemotherapy (3 systemic, 2 regional chemotherapy, Schettlauer et al 1993. Ib, NGTATG 1992. Ib, Beretta et al 1994. III, Allen-Mersh et al 1994. IIb) has demonstrated an improved survival with chemotherapy compared with best supportive care (p=0.002). The evidence indicates that early chemotherapy (12 weeks therapy) prior to clinical deterioration for advanced disease improves survival by 3 to 6 months without any adverse impact on quality of life. A rest from treatment with close observation until disease progression is not detrimental to survival and contributes to improved quality of life (Maughan 2001).

Selection of patients for chemotherapy requires the opinion of a medical oncologist experienced in colorectal cancer chemotherapy. Poor performance status, low serum albumin, high alkaline phosphatase and liver involvement were independent predictors of progression, and low serum albumin, high y-glutamyl transferase and high CEA predicted poor survival (Fontzilas et al 1996. III). Performance status is a particularly potent indicator. In a meta-analysis of patients treated in trials of 5FU-based chemotherapy, median survivals were 4, 10 and 14 months for patients with ECOG performance status scores of 2, 1 and 0 respectively (Thirion et al 1999. Ia) (See Appendix 3). However, whilst these variables may help identify patients with an overall poor prognosis, they do not necessarily predict who will or will not benefit from chemotherapy.

The mainstay of treatment is still 5-fluorouracil. The following conclusions can be drawn regarding 5FU therapy in metastatic colorectal cancer:

1. Infusional regimens (at least 24h duration) of 5FU double response rates (23% v 13% P<0.003) compared with bolus regimens with a small improvement in median survival (Meta-analysis Group in Cancer (MGC), 1998. Ib) and reduced toxicity (MGC, 1998. IIa).

2. Hepatic arterial infusion (HAI): HAI with 5FU or FUDR increases response rate for isolated hepatic metastatic disease from 14% to 41% (p<0.0001) compared with IV regimens (MGC 1996. IIa). No survival advantage is proven at present.

3. Biomodulation is the use of a second agent to modulate the cellular response to 5FU therapy. Biomodulation of 5FU with folinic acid doubles response rates and has become a standard component of therapy (23% v 11% p<0.0001). (ACCMP 1992. IIa). Low-dose folinic acid has been shown to be as effective as high-dose when used in combination with bolus regimens of 5FU.

4. Combined therapy with established drugs: The combination of protracted venous infusion of 5FU with mitomycin C (I RCT) has shown improved response rate, progression-free survival and survival compared with 5FU alone (Ross et al 1997. Ib). Biomodulation of 5FU with methotrexate doubles response rate (19% v 10% p<0.0001) with a small improvement in survival. (Median survival 10.7 v 9.1 months; p=0.02) NHS Exec 1997. IV). It has not been shown to be superior to folinic acid modulation. Neither cisplatin or interferon have been shown to be beneficial when combined with 5FU (NHS Exec 1997. IV).

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

Several new chemotherapeutic agents have been evaluated in the last five years.

1. Thymidilate synthase (TS) targeted chemotherapy

   A number of new agents have been evaluated which also target TS. These include 5FU prodrugs (e.g. capecitabine) and agents using the reduced folate pathway (ralitrexed). No evidence of increased efficacy over optimal usage of 5FU has been demonstrated for any of the agents to date. Equivalent survival benefit with increased ease of administration has been documented for capecitabine and 5FU with respect to bolus 5FU and low dose folinic acid (Pazdur et al 1999. Ib, Carmichael et al 1999. Ib, Twelves et al 1999. Ib, Cox et al 1999. Ib). For raltitrexed, equivalent survival and response rates have been demonstrated (Cunningham et al 1996. Ib, Cocconi et al 1998. Ib, Pazdur & Vincent 1997. Ib, Mauaghan et al 1999. Ib) but with increased toxicity when compared with infusional 5FU schedules (Mauaghan et al 1999. Ib). Treatment-related deaths range from 3-6% in the trials and particular attention to renal function, patient selection and supervision is required for safe usage of this agent.

2. Irinotecan


3. Oxaliplatin

   Oxaliplatin is a novel platinum agent which acts by DNA cross-linking. For second line therapy, Phase 2 trials show activity in 5FU-refractory colorectal cancer by the addition of oxaliplatin to a 5FU regimen (Raymond et al 1998. Ib). In first-line therapy, two trials show improved response rate and progression-free survival using oxaliplatin in combination with 5FU in first-line treatment versus 5FU alone, but no overall survival benefit has been documented, although a high proportion of patients crossed over to the combination therapy on progression (de Gramont et al 2000. Ib, Giacchetti et al 1997. Ib). Side-effects of oxaliplatin include some enhanced 5FU toxicity (diarrhoea, mucositis, hand-foot syndrome, myelotoxicity, nausea, vomiting and reversible cold-induced sensory neuropathy).

Recommendations

Patients with evidence of unresectable metastatic disease should be referred to a medical oncologist for consideration of palliative chemotherapy as soon as the diagnosis of metastatic disease is made.

Grade A

Chemotherapy for metastatic colorectal cancer should only be given after discussion at the Multi Disciplinary Team Meeting and under the direction of recognised oncologists within facilities conforming to JCCO guidelines.

Grade C

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

Grade C

On current evidence, standard therapy should include an infusional 5FU regimen combined with the use of irinotecan in first line or on 5FU failure if the patient remains fit for chemotherapy (Performance Score 0-1).

Grade A

Hepatic arterial infusional chemotherapy remains of unproven benefit.

Grade A

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

Grade B

D Palliative Care

The diagnosis and treatment of cancer can have a devastating impact on the quality of patients’ lives and that of their families and carers. Cancer patients face uncertainty and may have to undergo unpleasant and sometimes debilitating treatments. Patients, families and carers need access to support from the time that cancer is first suspected through to death and into bereavement.

Good communications between health professionals and patients is essential for delivery of high quality care. It is also central in empowering patients involvement in decision-making. All cancer
patients, but particularly those with advanced or incurable disease, need to receive high quality information, symptom control, psychological, social and spiritual support.

In the past patients tended to be referred for palliative care only when they were in the terminal phase of their illness. But increasingly palliative care is being seen as an integral part of care, often being delivered alongside curative treatment. Careful and expert symptom control is an important aspect of quality of care.

All patients should have access to specialist palliative care advice and services appropriate to their needs. Services should be provided in the community and in hospitals as well as in specialist palliative care units. The overall management plan agreed with the patient and family should include the understanding of the extent to which the patient wishes to be informed and involved in decision-making, how far active treatment should be pursued and where the patient would prefer to die.

**Recommendations**

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

**Grade B**

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

**Grade C**

It is important that patients with colorectal cancer are offered the opportunity to ask questions and to have important information repeated. Information-giving should be seen as an essential part of every consultation.

**Grade C**
a. Operative mortality
Operative mortality for operations for colorectal cancer varies according to whether the operation category is elective or emergency and whether it is curative or palliative. For curative resections, considerable variation exists among surgeons, with 30 day mortality ranging from 0 to 20% (McArdle & Hole 1990. IIb).

It is therefore recommended that surgeons should expect to achieve an operative mortality of less than 20% for emergency surgery and 5% for elective surgery for colorectal cancer.
Grade B

b. Wound Infection
With modern antibiotic prophylaxis the rates of wound infection (as evidenced by pus) should be less than 10% (Page et al 1992. Ib, Rowe-Jones et al 1990. Ib).
It should be noted, however, that a rate of 2% for elective colorectal surgery has been reported (Matheson et al 1985. III).

It is therefore recommended that wound infection rates after surgery for colorectal cancer should be less than 10%.
Grade A

c. Recurrence rates
As indicated in the sections on surgical technique and adjuvant therapy, local recurrence after resection of rectal cancer may be influenced by surgical technique and the use of radiotherapy. Current evidence suggests that, with the use of optimal surgical techniques and pre-operative radiotherapy for tethered or fixed tumour, local recurrence rates of 10% or less should be achievable.

It is therefore recommended that surgeons should audit their results and aim to achieve local recurrence rates after curative resection of 10% or less.
Grade A

d. Survival rates
The overall 5-year survival rate for colorectal cancer in the UK is currently in the region of 38% (CRC 1993 2).
Data from the Birmingham Cancer Registry between 1977 and 1981 indicates that after curative resection, 5-year age-adjusted survival rates for colon cancer are 85%, 67% and 37% for Dukes’ stage A, B and C respectively. For rectal cancer, the equivalent figures are 80%, 55% and 32% (Slaney et al 1991. IIb).

It is recommended that surgeons should audit the survival rates of patients and examine carefully their practice with a view to meeting or improving on targets set by national statistics.
Grade B
Follow-up

Reasons for Follow-up
The value of routine follow-up investigations for colorectal cancer patients after treatment is controversial. Trials show that intensive routine investigations are not associated with survival improvement and no established strategy of routine follow-up is agreed. Reasons for follow-up after apparently curative operation for colorectal cancer can be summarised as follows:

a. Detection of recurrent disease at an early or pre-symptomatic stage when further attempts at cure might be possible.
b. Surveillance in order to detect metachronous tumours.
c. Provision for psychological support for the cancer patient.
d. Facilitation of audit and outcome.

All patients should have access to follow-up facilities, and the evidence relating to methods, frequency and efficacy of clinical follow-up is examined in the next section.

Nature and Frequency of Follow-up
Follow-up policy after curative resection for colorectal cancers is controversial, and there is very little consensus among surgeons. In the Trent/Wales audit (IIb), although all surgeons reviewed their patients after operation, the frequency of follow-up varied from a single appointment to lifelong surveillance. Various combinations of 12 different imaging, biochemical and endoscopic investigations were used to detect recurrence, but only 22 surgeons employed comparable regimens. A similar variation in practice is reported by members of the American Society of Colon and Rectal Surgeons (1994). To examine the evidence relating to the efficacy of follow-up, it has been subdivided into four categories based on the reasons for follow-up.

a. Detection of recurrent disease
The case for frequent follow-up during the first two years after surgery is based on the observation that 8% of recurrences are detected during this period (Umpleby et al 1984. III). Despite frequent clinical review during this time, many patients become symptomatic from recurrence between hospital appointments (Cochrane et al 1980. III, Hulton and Hargreaves 1989. III) and even the addition of an intensive investigation programme fails to detect approximately 50% of asymptomatic recurrences (Tornqvist et al 1982. IIb, Bohn et al 1993. IIb). Symptomatic recurrence is rarely amenable to curative surgery (Camunas et al 1991. III, Safi et al 1993. III Wyatt & Aitkin 1994. III), but the diagnosis of asymptomatic recurrence, particularly in the liver, is more likely to result in attempts at curative re-operation (O vaska et al 1990. IV).

Bruinvels and colleagues (1994. III) set out to perform a meta-analysis of published studies to determine whether intensive follow-up is associated with increased 5-year survival rates. They were unable to identify a single randomised trial with patients allocated to follow-up or no follow-up groups. They therefore investigated non-randomised studies in which controls were either historical or self-selected (defaulted from follow-up). Of the seven such studies available in the literature the authors were unable to draw definite conclusions. Their suggestions included regular follow-up and monthly carcino-embryonic antigen (CEA) measurements for the first two or three years, combined with aggressive hepatic surgery as indicated. This conclusion, however, was not based on the results of their meta-analysis.

There is little doubt that an elevation of CEA after apparently curative resection of colorectal cancer is frequently associated with recurrent disease. Although this precedes clinical evidence of recurrence, there is still no evidence that the lead time provided by CEA monitoring confers any survival benefit. In a 400 patient multicentre study 75 patients underwent second-look surgery, prompted either by a rise in CEA in 43 (57%) or clinical signs in 32 (43%). Resection for cure and survival was the same for patients in each group (M artin et al 1985. IIa). A further large prospective, but not randomised, study found that the proportion of patients alive and clinically disease-free at least one year after CEA prompted re-operation was similar to that of patients who did not have CEA monitoring (M ortel et al 1993).

In summary, 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 fit patients during the first two post-operative years for the purpose of detecting operable liver metastases.
b. Surveillance for metachronous cancers
Patients with colorectal cancer are at increased risk of developing adenomas and a secondary primary (metachronous) cancer in the remaining large bowel (Heald & Lockhart Mummery 1972. IIb, Tornqvist et al 1981. IIb), and surveillance colonoscopy after the initial resection results in a substantial yield of such tumours (Juhl et al 1990. III). On this basis it may be recommended that patients should undergo colonoscopic follow-up, and if the colon is free of tumours then further colonoscopy should be repeated at three to five year intervals (Brady et al 1990. III, Winawar et al 1993. Ib), at least until the age of 70 years (Kronborg et al 1983. IV, Barlow & Thompson 1994. IV). If tumours are found, however, the examination should be repeated sooner. It must be stressed, however, that there is no evidence that colonoscopic follow-up has a significant impact on survival following surgery for colorectal cancer.

Colonoscopy cannot be recommended for the detection of anastomotic recurrence which is largely a feature of low colorectal anastomoses (Juhl 1990. III). Recurrence at the site should be palpable by digital rectal examination, or seen at rigid sigmoidoscopy. It has been recommended that a rectal anastomosis is examined every three months for two years, every six months for two years and then annually (Rosen et al 1992. IV). There is no evidence, however, that this practice improves survival. The results or re-operation in this group are disappointing, although an occasional patient enjoys long term survival (Juhl et al 1990. III).

c. Provision of Psychological Support
The social and psychological morbidity associated with anorectal excision (Devlin et al 1973. III) can be minimised by a combination of attention to surgical technique, provision of community services and support from a stoma specialist. However, surgery for colorectal cancer gives rise to considerable morbidity from impaired bowel, psychological and sexual function (Sprangers et al 1993. III). Little is written about the effects of routine follow-up on quality of life after surgery for colorectal cancer. A study of patients with various cancers, including colorectal, found that the majority were in favour of regular follow-up and thought that the advantages outweighed the disadvantages (Kiebert et al 1993. IIb). Patients with breast cancer prefer follow-up and hospital visits do not increase the stress and anxiety (GIVO 1994. IIb, Morris et al 1992). There are no comparable studies in patients who have undergone curative resection for colorectal cancer.

d. Facilitation of Audit
It is only by audit that surgeons can evaluate their results at professional standards. Without this information the stimulus to investigate and perhaps change personal practice is lost. If guidelines are to be of value, surgeons must audit their results and for this some form of follow-up is essential. Currently adequate audit facilities are not available in most Irish hospitals due to lack of central funding.

Grade B
There is no evidence that colonoscopic follow-up improves survival but it has been shown to produce a high yield of treatable tumours. If such a policy is pursued, it is recommended that a “clean” colon should be examined by colonoscopy at 3-5 year intervals.

In the absence of randomised trials, the most persuasive arguments for routine follow-up are patient support and audit. Audit should be structured with particular reference to outcome measures, and should be regarded as a routine part of the consultants work.

Grade C
All patients with a stoma should have ready access to specialist nursing staff.

Grade C
NURSING CARE

Cancer care is a specialty in which specially trained nurses play an important role. Nurses involved in the care of patients with colorectal cancer need to be able to provide information and support for both physical and psychological needs. Locally agreed standards of care should be implemented specific to each treatment modality and cover all aspects of the cancer nursing practice. The services of a colorectal clinical nurse specialist should be viewed as a desirable component of the multi-disciplinary approach. **Grade C Level IV**

Nursing assessment is of value in the planning of treatment of patients with colorectal cancer. This assessment should be carried out by a specialist nurse who should address the needs not only of patients but also of their families, as well as other personal issues. Access to information and advice concerning colorectal cancer is an essential part in ensuring that patients cope adequately with their diagnosis. Despite clinicians’ involvement with their patients, it is often the nurse who plays a key role in ensuring that vital information is retained as well as re-explained at a later occasion.

The appropriate information should be made available to the patients and their relatives in order to promote maximum understanding and assist coping mechanisms. Patients should be made aware of the availability of written materials and telephone line services at all stages of disease management. **Grade A Level 1b**

It is of considerable help to patients if specially trained nurses can recognise anxiety and depression in patients with colorectal cancer and assist in referring to appropriate personnel, to reduce patients’ emotional distress and improve their chances of coping with their disease.

All patients should have access to appropriately trained nursing staff. Patients shown to be suffering from psychological or psychiatric morbidity should be referred for specialist care. **Grade C Level IV**

All patients who require a stoma following colorectal surgery should be seen by a stoma therapist prior to surgery where possible, and for on-going advice and support. **Grade C Level IV**

It is well-documented that patients with stomas have higher levels of psychological distress, restriction of social activity and impaired sexual function. Access to a stoma therapist increases patient satisfaction and ability to both cope with the disease and with the stoma. After discharge from hospital, patients should have access either directly or by telephone link to a specialist nurse.

Such access allays fears and helps assist recovery. Continuity of care in the community is essential and stoma therapists have a pivotal role to play by home visits.
HISTOPATHOLOGY REPORTING

Access

i. Indications

Accurate, detailed and consistent pathology reporting is important for estimating prognosis and planning further treatment. When applied to groups of patients it is also an index of any shift towards earlier diagnosis which may result from screening programmes. Unfortunately, the quality of pathology reporting has been found to be highly variable (Bull et al 1997), and this has important implications for the interpretation of differences in outcomes in different areas of the country. The use of structured proformas has been demonstrated to improve the informational content of pathology reports (Cross et al 1998).

The structure of a pathology report depends on whether the tissue submitted is a locally resected carcinoma or a full resection specimen. Such reporting should be available for all patients, and it is the surgeon’s responsibility to ensure that all resection specimens, including polyps, are sent for histological examination.

Process

i. Local resections

Local resection includes polyps excised endoscopically which are found to be malignant on subsequent histological examination and sessile tumours which are electively treated by formal surgical transanal excision. In each case it is essential that the pathologist assess all excision lines. For polypectomy specimens this requires careful examination of the stalk at the base of the polyp, usually requiring multiple sections. For formal excisions it is important to assess the whole of the deep resection plane, and for the pathologist to be able to do this adequately the surgeon should pin the specimen out on a cork mat before fixation, so that multiple properly orientated blocks can be taken for histological examination.

When invasive malignancy is identified in a polypectomy or formal excision specimen, more radical surgery is indicated if:

- there is doubt about completeness of excision of the carcinoma
- there is invasion of muscularis propria
- the invasive tumour is poorly differentiated (criteria of Morson 1985).

The pathology report of locally resected carcinoma must therefore make specific mention of each of these parameters.

There is considerable evidence to suggest that lymphatic or vascular invasion in the submucosa (including the polyp stalk) is also an indication for further surgery (Coverlizza et al 1989), but this has not been confirmed in other studies (Geraghty et al 1991).

There is also some controversy over the management of locally excised pT1 tumours in which the carcinoma invades the full thickness of the submucosa (so-called Kikuchi type Sm3 tumours) as some authorities also regard this as an indication for further surgery (Kikuchi et al 1995).

ii. Full Resection Specimens

It is important to know if a tumour has been completely excised and how advanced it is, as both of these parameters may affect further treatment. In order to provide this information there must be proper fixation of the specimen and careful pathological dissection prior to selecting tissue blocks for histology. In order to assess the circumferential resection margin in rectal cancers, it is strongly recommended that this margin is painted with ink before sectioning and slicing at 3–4mm transversely through the whole of the tumour and the entire mesorectum distally and proximally. Dukes’ staging requires the separate identification of the “apical” lymph node, i.e. the node closest to the main vascular ligature.

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 as set out below.

Joint National Guidelines Minimum Dataset for Colorectal Cancer Histopathology Reporting

These proposals for reporting of colorectal cancer should be implemented for the following reasons:

1. Patients who have lymph node involvement (Dukes’ stages C1 and C2, TMN stages pN1, pN2) are likely to receive adjuvant chemotherapy which is of possible benefit but is somewhat toxic and expensive (Moertel et al 1995, IMPACT 1995).

2. Patients with rectal adenocarcinoma and circumferential margin involvement are at high risk of local recurrence (Quirke et al 1986).
Adam et al 1994. IIb, Ng et al 1993. IIb) and may receive post-operative radiotherapy with or without chemotherapy which is toxic and costly but may decrease the likelihood (MRC Rectal Cancer Working Party 1996. Ib, Thomas & Linbald 1988. Ib) of death from this unpleasant and nearly uniformly fatal complication. The frequency of circumferential margin involvement found may reflect the quality of the surgical operation (Quirke 1997. IIb).

3. To confirm that radical surgery was necessary and to place the patient in the appropriate stage so that the individual can be given a prognosis. In addition surgeons can accurately audit their outcomes while avoiding case-mix selection bias.

4. To identify whether the anal sphincter has been lost. The frequency of abdomino-perineal resections is an indicator of the quality of surgery.

5. To allow the equitable comparison of surgeons in colorectal cancer audits, (McAriddle & Hole 1991. IIb, Hermanek et al 1995. IIb) to identify good surgical practice (Quirke 1997. IIb) and to allow comparison of patients in clinical trials.

The form reproduced on the next page has been devised to include the minimum amount of data required for a careful assessment of a colorectal cancer specimen. It is evidence-based and has been widely discussed. It has been approved by the Royal College of Pathologists and Surgeons (England), the Associations of Coloproctology and Clinical Pathologists, the United Kingdom Co-ordinating Committee for Cancer Research Colorectal Cancer Subcommittee, the Scottish Intercollegiate Guidelines Network, the Welsh CROPS Project and the UK Association of Cancer Registries.
**JOINT NATIONAL GUIDELINES MINIMUM DATA SET FOR COLORECTAL CANCER HISTOPATHOLOGY REPORT**

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surname</td>
<td></td>
</tr>
<tr>
<td>Forenames</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td></td>
</tr>
<tr>
<td>Hospital Number</td>
<td></td>
</tr>
<tr>
<td>Date of receipt</td>
<td></td>
</tr>
<tr>
<td>Date of reporting</td>
<td></td>
</tr>
<tr>
<td>Report Number</td>
<td></td>
</tr>
<tr>
<td>Pathologist</td>
<td></td>
</tr>
<tr>
<td>Surgeon</td>
<td></td>
</tr>
</tbody>
</table>

**Gross Description**
- Site of tumour
- Maximum tumour diameter
- Distance tumour to nearer margin (cut end)
- Presence of tumour perforation (pT4)

**Metastatic Spread**
- Number of lymph nodes examined
- Number of positive lymph nodes
  - pN1 1-3 nodes, pN2 4+ nodes involved

**For rectal tumours**
- Tumour is
  - Above
  - Below
- the peritoneal reflection
- Distance from the dentate line

**Histology type**
- Adenocarcinoma
  - Yes
  - No
- (to include mucinous and signet ring adenocarcinomas)
- If No, specify

**Background abnormalities**
- Ulcerative colitis
  - Yes
  - No
- Crohn’s disease
  - Yes
  - No
- Familial adenomatous polyposis
  - Yes
  - No

**Other Comments**

**Local invasion**
- Submucosa (pT1)
- Muscularis propria (pT2)
- Beyond muscularis propria (pT3)
- Tumour cells have breached the peritoneal surface or invaded adjacent organs (pT4)

**Margins**
- Tumour involvement
  - N/A
  - Yes
  - No
- Doughnut
  - Yes
  - No
- Margin (cut end)
  - Yes
  - No
- Circumferential margin involvement
  - Yes
  - No

**Pathological staging**
- Complete resection at all margins
  - Yes
  - No
- T N M
  - T
  - N
  - M

**Dukes’**
- A (growth limited to wall, nodes negative)
- B (growth beyond muscularis propria, nodes negative)
- C1 (nodes positive and apical node negative)
- C (apical node positive)

**Histological measurement from tumour to circumferential margin**

**Signature**

**Date**
NOTES FOR PATHOLOGISTS
FOR RECORDING

Data items for all primary colorectal cancers should be recorded, with all measurements in mm.

GROSS DESCRIPTION

Site of Tumour
This will usually be stated on the request form. However, if examination of the specimen suggests that the stated site is incorrect this should be queried with the surgeon and corrected if necessary.

Maximum Tumour Diameter
Measured from the luminal aspect of the bowel. The thickness of the tumour is ignored for this measurement.

Distance of Tumour to Nearest Margin
Measured from the nearest cut end of the specimen, not the circumferential margin. It is only necessary to examine the margins histologically if tumour extends macroscopically to within 30mm of one of these. For tumours further than this it can be assumed that the cut ends are not involved. Exceptions to this recommendation are adenocarcinomas that are found on subsequent histology to have an exceptionally infiltrative growth pattern, show extensive vascular or lymphatic permeation, or are pure signet ring carcinomas, small cell carcinomas or undifferentiated carcinomas.

Presence of Tumour Perforation
If the tumour has perforated into the peritoneal cavity this should be recorded. Such cases are always regarded as pT4 in the TNM staging system. If perforation does not involve the tumour the “No” box should be marked.

FOR RECTAL TUMOURS

Relationship to the Peritoneal Reflection
The crucial landmark for recording the site of rectal tumours is the peritoneal reflection. This is identified from the exterior surface of the anterior aspect of the specimen.

Rectal tumours are classified according to whether they are:

a. entirely above the level of the peritoneal reflection anteriorly
b. astride (or at) the level of the peritoneal reflection anteriorly
c. entirely below the level of the peritoneal reflection anteriorly

Tumours below the peritoneal reflection have the highest rate of local recurrence.

Distance from Dentate Line
This can only be measured for low rectal tumours in abdomino-perineal excision of rectum (APER) specimens. This measurement is important as it identifies patients who have lost their internal sphincter.

HISTOLOGY

Type
Virtually all colorectal cancers are adenocarcinomas. Other rare forms worthy of special mention are:

- Adenosquamous carcinomas
- True squamous carcinomas (not including upwardly spreading tumours)
- Adenocarcinoid (composite carcinoma/carcinoid) tumours
- Small cell carcinomas
- Totally undifferentiated carcinomas

Mucinous carcinomas and signet ring carcinomas are recorded as adenocarcinomas.

Differentiation by Predominant Area
Poorly-differentiated carcinomas should be separated from other types, but only if this forms the predominant area of the tumour. Small foci of apparent poor differentiation are not uncommon at the advancing edge of tumours, but these are insufficient to classify the tumour as poorly-differentiated.

The criteria for poorly-differentiated tumours are either irregularly folded, distorted and often small tubules or the absence of any tubular formation.
Local Invasion
The maximum degree of local invasion into or through the bowel wall is recorded, so only one of the four boxes should be marked.

Sufficient blocks of the tumour should be taken to assess local invasion. It is recommended that the whole tumour and attached mesentery (or mesorectum) are serially sliced at 3-4mm intervals with a sharp knife in order to identify the areas of deepest invasion macroscopically, which should be blocked for histological confirmation.

Involvement of the serosal (peritoneal) surface is defined as the presence of tumour cells on the peritoneal surface. Thus tumour cell penetration of the serosa needs to be seen by penetration or ulceration. This does not constitute circumferential margin involvement since there is no involvement of a retroperitoneal margin.

Margins
Tumour Involvement
Doughnuts
It is not necessary to examine doughnuts histologically if the main tumour is less than 30mm from the cut end of the main specimen or in other rare cases described above but this is a decision to be made in accordance with local practice.

When doughnuts from stapling devices are examined histologically the presence or absence of tumour is recorded. If doughnuts are not sectioned because it is deemed unnecessary, or if no doughnuts are submitted for examination by the surgeon, this item should be recorded as “not applicable”.

Margin (cut end)
When cut ends are examined histologically (see criteria above) the presence or absence of tumour should be recorded. If margins are not examined histologically they should be recorded as “not applicable”.

Circumferential Margin (rectal cancers only)
Accurate assessment of the circumferential (radial) margins of rectal tumours is most important because it influences post-operative therapy.

The circumferential margin is reported only for rectal cancers; for tumours at other sites the “not applicable” box is marked. It represents involvement of the surgical margins of the connective tissues around the rectum in an area where there is no peritoneal covering. Hence involvement of this margin is different from, and quite unrelated to serosal involvement.

Anteriorly the rectum is covered by peritoneum and only the area below the peritoneal reflection is at risk of circumferential margin involvement. Posteriorly this area and the area above it, a triangular-shaped bare area running up to the start of the sigmoid mesocolon, are at risk from not only direct tumour spread but also metastatic deposits in lymph nodes that lie against the circumferential margin.

It is recommended that the whole of this margin (i.e. the mesorectum) is painted with a marker such as silver nitrate or India ink before dissecting the specimen. The tumour is then best sliced serially at 3-4mm intervals to select blocks from areas that are closest macroscopically to the circumferential margin. Slices should then be made of the area above and below the tumour to look for metastatic deposits. If lymph nodes lie against the circumferential margin then this margin should be included in the block.

The minimum distance between the tumour and the circumferential margin in millimetres is also recorded from the histological slides. If this is less than 1mm then the circumferential margin is regarded as involved in the assessment on completeness of resection later in the proforma. Such involvement may be through direct continuity with the main tumour, by tumour in veins, lymphatics or lymph nodes, or by tumour deposits discontinuous from the main growth.

Metastatic Spread
Number of lymph nodes examined
All lymph nodes found in the specimen should be sampled and counted, regardless of their site or size.

Number of positive lymph nodes
This must be equal to or less than the number of lymph nodes sampled.

Extramural tumour deposits measuring more than 3mm are counted as involved lymph nodes even if no residual lymph node structure can be identified. Smaller deposits are regarded as apparent discontinuous extensions of the main tumour.

In the TNM staging system, pN1 corresponds to involvement of 1-3 nodes and pN2 to involvement of 4 or more nodes (A previously used pN3 category was dropped in the 1997 TNM revision).
Apical node positive
For Dukes’ staging the pathologist will only need to identify separately the apical lymph node closest to the main vascular tie. This is not defined by any measure of distance, but is simply the first node identified by slicing the mesentery serially and distally from the vascular tie.

Extramural vascular invasion
This is recorded when tumour is present within an extramural endothelium-lined space that is either surrounded by a rim of muscle or contains red blood cells.

Background abnormalities
The presence or absence of the following in the background bowel is recorded
- Adenoma(s)
- Synchronous carcinoma(s) (each of which will require a separate proforma)
- Ulcerative colitis
- Crohn’s disease
- Familial adenomatous polyposis

PATHOLOGICAL STAGING
It is recommended that Dukes’ and TNM staging is used. The proforma is designed for both systems.

Complete resection at all margins
This includes the doughnuts, the ends of the specimen and, for rectal tumours, the mesorectal circumferential resection plane.

Where doughnuts and the ends of the specimen are not examined histologically because the tumour is more than 30mm away these are assumed to be tumour-free. Circumferential margins of rectal tumours are regarded as involved if tumour extends histologically to within 1mm of this margin.

Peritoneal (serosal) involvement alone is not a reason to categorise the tumour as incompletely excised.

TNM
Here the T stage and the N stage are derived from the extent of local spread and lymph node metastases, the criteria for each stage being defined on the form. The appropriate figure is entered in each box. The prefix P is used to indicate pathological staging. If the patient has had pre-operative chemotherapy or radiotherapy then the prefix Y P should be used to indicate that the stage found may not be the presenting stage of the tumour.

The following should be noted:

i. In determining the pT stage, tumours that have perforated into the peritoneal cavity are regarded as pT4, irrespective of other factors.

ii. Direct intramural spread of caecal carcinomas into the terminal ileum does not affect the pT stage. However direct extramural spread (across the serosa) of a colorectal carcinoma into another part of the large or small intestine corresponds to pT4.

iii. Extramural deposits of tumour that are not obviously within lymph nodes are regarded as discontinuous extensions of the main tumour if they measure less than 3mm in diameter, but as lymph nodes if they measure more than 3mm in diameter.

iv. The difference between stages pN1 and pN2 is the number of lymph nodes involved (pN1 = 1-3 nodes, pN2 = 4+ nodes), irrespective of their site in the resection specimen.

v. Pre-operative radiotherapy (including short course) diminishes lymph node yield and downstages tumours. Identification of such tumours is essential when comparing outcomes. The pathological staging of these tumours can be identified by insertion of a y prefix (for example a “pT3” tumour becomes a “ypT3” tumour) to indicate that this tumour has received pre-operative irradiation (TNM classification of Malignant Tumours 5th edition. III).

vi. Pathological M staging can only be based on distant metastases that are submitted for histology by the surgeon and will therefore tend to underestimate the true M stage. Pathologists will therefore only be able to use M1 (distant metastases present) or MX (distant metastases unknown). Note that metastatic deposits in lymph nodes distant from those surrounding the main tumour or its main artery in the specimen, which will usually be submitted separately by the surgeon (e.g. in para-aortic nodes or nodes surrounding the external iliac or common iliac arteries), are counted as distant metastases and hence pM1.

Dukes’
Here one of the four boxes is marked, corresponding to the Dukes’ stage. Criteria used for Dukes’ staging are given on the form. Note that Dukes’ so-called stage D is not used.
Histologically confirmed liver metastases
Here one of the two boxes is marked. If no liver biopsy is submitted with the resection specimen the “No” box should be marked.

Recommendations
All resected colorectal tumours should be submitted for histopathological examination, which should reach acceptable quality standards as outlined above.

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

Grade C
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.

Grade B
Pathological examination of colorectal cancer specimens should be carried out in laboratories which perform to high technical standards and which participate in external quality assessment schemes and regular audit of technical procedures and diagnosis.

Grade B
References


110. Norum J. Adjuvant chemotherapy in Dukes' B and C colorectal cancer has only a minor influence on psychological distress. Supportive Care in Cancer. 1997; 5 318-21.


Colorectal Cancer Management
Clinical Guidelines

Prepared by The Clinical Guidelines Committee
Royal College of Surgeons in Ireland
November 2002