Recommendation for Future Development of Colorectal Cancer Surgery in Ireland

and

Guidelines for the Management of Rectal Cancer in Ireland

IRISH ASSOCIATION OF COLOPROCTOLOGY IACP

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Quality Assurance Guidelines for the Management of Rectal Cancer in Ireland

Expert Group Report

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REFERENCES

1 Recommendations for Future Development of Colorectal Cancer Surgery in Ireland

1.1 Context of recommendation

In 2006, the government published **A Strategy for Cancer Control in Ireland** and in June of that year established the **National Cancer Control Programme** to ensure its implementation. The Strategy identified an evidence-based need for rationalisation and networking to improve the standard of cancer services in Ireland. Professor Tom Keane, Interim Director of the National Cancer Control Programme, was appointed to direct its implementation. The strategy designates eight cancer centres nationally and proposes restriction of cancer surgery to these centres. Centralisation of breast cancer surgery was among the first recommendations of the strategy to be implemented with immediate cessation of breast cancer surgery in 13 centres performing low volumes of such surgery. This was followed by a reduction in the number of breast cancer surgical centres over the next 2 years. Plans for centralisation of surgery for other cancers, including rectal cancer, are currently in progress.

Launching the Strategy, The Minister for Health, Mary Harney TD stated that "we need to develop better ways of hospitals and health professionals working together based on connection and partnership rather than on isolation and self-sufficiency". With this in mind, the **Irish Association of Coloproctology (IACP)** contacted Professor Tom Keane in May 2008 indicating our support for this process of improving standards of care in the provision of colon and rectal cancer surgery and confirming our willingness to participate in an audit of rectal cancer. Professor Keane indicated that the results of such an audit would be used to arrive at a detailed plan for the future delivery of rectal cancer surgery services in Ireland. Following on from this a national audit of all rectal cancer surgery performed in Ireland in 2007 was commenced by the **Royal College of Surgeons in Ireland (RCSI)** in collaboration with the **National Cancer Registry,** and is now complete. The audit was a retrospective chart review which is necessarily limited in scope. It highlighted the need for robust national audit mechanisms and the IACP and RCSI are committed to supporting development of such a system. The **2007 RCSI National Rectal Cancer Surgery Audit** does, however, provide accurate independent verification of the number of rectal cancer operations performed in each hospital audited as well as some data relating to quality of surgery and pathology. The current document is the recommendation of the Irish Association of Coloproctology expert group providing a framework for the future development of rectal cancer surgery services in Ireland.

1.2 Expert Group Extraordinary General Meeting

The Irish Association of Coloproctology (IACP), established in 1987, is an all-Ireland network of surgeons with a special interest in colorectal cancer surgery. The Royal College of Surgeons in Ireland (RCSI) acts as an advisory body in Ireland on matters relating to surgical practice and is the statutory postgraduate training body for surgeons. An extraordinary general meeting of the Republic of Ireland members was called under the chairmanship of Mr. Roy Maxwell, President of the IACP and a practicing colorectal surgeon in Belfast. The President of the RCSI, Professor Frank Keane, was in attendance. This expert

group comprised 21 surgeons from hospitals in which 394 operations for rectal cancer were performed in 2007, representing 88% of all operations for rectal cancer performed in Ireland in 2007 according to the RCSI rectal cancer surgery audit. Surgeons involved in the Expert Group EGM are listed in Appendix 1.

1.3 **Specific Issues Relating to Colorectal Cancer**

Proposed centralisation of colorectal cancer surgical services requires consideration of a number of specific factors. Colorectal cancer is extremely common with 2184 new cases reported by the National Cancer Registry in 2005. Not every patient who has rectal cancer is operable but the RCSI National Rectal Cancer Surgery Audit identified 558 new rectal cancer patients treated by surgeons, of whom 446 were treated by resection.

Although the National Cancer Control Programme supports centralisation of all colon cancer surgery into the 8 designated cancer centres, resources in these centres are currently insufficient to deal with the expected numbers of patients. Colorectal cancer patients require longer periods of inpatient care than many of the other types of cancer where centralisation is more advanced, such as breast cancer, even when managed care pathways and minimally invasive surgery are employed. In addition, a substantial percentage of colon cancer patients present as an emergency. These patients are currently cared for by general and colorectal surgeons on call in most hospitals. Such surgeons also provide a broad spectrum of other emergency general surgery services and centralisation of every experienced colonic surgeon would result in a substantial deficit in the provision of emergency surgical services in non-designated hospitals.

The separation of colon from rectal cancer is somewhat arbitrary and in many ways there is considerable overlap between the two in relation to the training necessary for surgeons and the support services required by patients, including stoma care. This is particularly the case in tumours apparently arising in the lower left colon and the rectosigmoid regions. It is highly likely that rectal cancer centers will treat significant numbers of rectosigmoid cancers, in addition to their rectal cancer workload. The IACP considers that such tumours require particular care in preoperative assessment, including rigid sigmoidoscopy, so that true rectal tumours (defined as tumours at or lower that 15cm on rigid sigmoidoscopy) are accurately identified and patients are considered for neoadjuvant treatment where appropriate. In planning rectal cancer centers, rectosigmoid tumours should be included to ensure adequate capacity to assess and treat these patients. Centralisation of surgery for such cancers will require an emergency service to be available to treat the 10% of patients who present as an emergency, as reported in the National Bowel Cancer Audit Project 2007 of the Association of Coloproctology of Great Britain and Ireland. Extrapolating from the RCSI National Rectal Cancer Surgery Audit numbers, 40-50 emergency rectal cancer presentations annually should be expected. While the 2007 data is a useful starting point in predicting caseloads, the anticipated increase in the incidence of colorectal cancer due to an aging population and improved diagnosis of operable patients must also be considered. Patients with colon cancer also deserve a high quality surgical service, delivering the full range of colorectal surgical options available to treat colon cancer. **A National Colon Cancer Surgery Audit is urgently required.**

A further issue arises in relation to the provision of expert colorectal surgical services for benign disease. Centralisation of rectal cancer surgery without also considering surgical services for complex benign pelvic colorectal conditions is dangerous. The skill set required by rectal cancer surgeons is identical to that required to treat complex benign pelvic disease, including Crohn's disease, ulcerative colitis and diverticular disease. Experience gained by colorectal surgeons treating complex benign disease benefits patients treated for cancer. The opposite is also the case. While benign disease is outside of the remit of the current recommendation, the IACP believes the arbitrary separation of complex benign and malignant colorectal conditions is not in the best interest of either group of patients. Patients with complex benign and malignant colorectal conditions should continue to be treated by colorectal surgeons in specialist centres where a full range of support services is available. **Rectal cancer patients must be treated in fully functioning and appropriately resourced departments of colorectal surgery in order to achieve best outcomes.**

The RCSI National Rectal Cancer Surgery Audit identified 558 new rectal cancer patients treated by surgeons, of whom 446 were treated by resection. This independently verified number is substantially larger than the estimates available at the time of formulating the National Cancer Control Programme in 2006. The National Cancer Control Strategy designated eight (8) cancer centres and proposed that four (4) would provide rectal cancer surgical services. The IACP agrees that centralisation of rectal cancer surgery is required but considers that confining rectal cancer surgery to four centers is neither feasible nor necessary. The RCSI National Rectal Cancer Surgery Audit identified 18 surgeons who treated one rectal cancer patient each in 2007. Low volume practice of this nature is clearly associated in the literature with worse outcomes and cannot be supported. At the opposite extreme, restricting rectal cancer surgery to 4 centres would result in unnecessarily prolonged waiting times for rectal surgery due to the caseload of rectal cancer patients requiring treatment in each center and resulting pressure on limited bed capacity in these units. It would also result in depletion of skilled staff, such as stoma care nurses and colorectal nurse specialists, from other cancer centers with a consequent adverse effect on the care of patients with colon cancer and complex benign disease in non-rectal cancer centers. More colorectal surgeons would practice on multiple sites with a consequent loss of efficiency in their practice, with less time spent on patient care and more time spent on travel between sites.

The large number of rectal cancer resections in 2007, 446 operations, indicates that a greater number of rectal cancer centers could be designated while still meeting the requirement for high volume practice to ensure a uniformly high quality service. Confining rectal cancer surgery to a larger number of centers (i.e. more than 4) makes better use of existing national colorectal surgical manpower as well as existing diagnostic and therapeutic equipment.

The recommended minimum number of rectal cancer operations that should be performed annually varies in the literature as well as in international practice. Choosing an acceptable minimum number per hospital is necessary to ensure quality of surgery and post-operative care. An appropriately skilled multidisciplinary team is a valuable resource and it is both impractical and uneconomic to convene the necessary multidisciplinary team meetings for small numbers of patients.

The IACP is of the view that centralisation should take place in a phased manner. Low volume centers should stop performing rectal cancer surgery immediately. Specialist colorectal units should be the focus for all future rectal cancer-related appointments and developments. Non-designated hospitals should be actively integrated into rectal cancer centers to the greatest extent possible. A small number of non-designated hospitals have sufficiently high volume practice that their integration into cancer centers will pose some logistic challenges. These non-designated hospitals currently have the appropriate staff and equipment to treat rectal cancer and are currently treating a substantial percentage of rectal cancers. **Reconfiguration of services must not result in a reduction or compromise of the current standard of care provided to patients.** We propose that such non-designated centers should be allowed to continue to provide rectal cancer services in partnership with a designated rectal cancer center.

Colorectal cancer surgery in every hospital should be subject to mandatory participation in audit and all future decisions in relation to colorectal cancer surgery provision should be made on the basis of robust outcome data. Every Irish citizen has an equal right to expect high quality colorectal cancer surgical services, whether they avail of public or private treatment, and each has the right of access to a cancer center. National audit is urgently required to assure the public of the quality of the services provided in both sectors.

1.4 **Recommendations of the IACP EGM**

The following are the unanimous recommendations of the expert group:

1. The expert group unanimously recommends that rectal cancer surgery should not be performed in hospitals where fewer than 20 rectal cancer operations are carried out annually.
2. Rectal cancer surgery should be performed in all eight (8) designated cancer centres provided that
    a. the centre has > 20 patients operated on for rectal cancer each year.
    b. the centre treats patients to agreed national standards.
    c. the operating surgeon is trained in rectal cancer surgery, including TME.
    d. the centre has a named lead surgeon responsible for rectal cancer surgery.
    e. the centre has a fully functioning department of colorectal surgery, delivering services for both benign and malignant disease.
    f. every rectal cancer patient is discussed at a fully functioning multidisciplinary meeting including specialists in surgery, pathology, radiology, medical oncology, radiation oncology and nursing.
    g. the centre facilitates the integration of future rectal cancer surgery services at the centre.

h. the centre participates in national rectal cancer audit, including data from named satellite units in their network and reports their outcomes to the Association of Coloproctology of Great Britain and Ireland (ACPGBI) database.

3. Rectal cancer surgery may be performed in a small number of high volume non-designated hospitals (satellite units) as an interim measure provided that

   a. every rectal cancer patient is discussed at a fully functioning multidisciplinary meeting including specialists in surgery, pathology, radiology, medical oncology, radiation oncology and nursing located in one of the designated cancer centres for that network.

   b. each hospital designated as a satellite unit has > 20 patients operated on for rectal cancer each year.

   c. the centre treats patients to agreed national standards*

   d. the operating surgeon is trained in rectal cancer surgery, including TME.

   e. the centre has a fully functioning department of colorectal surgery, delivering services for both benign and malignant disease.

   f. the satellite unit participates in national rectal cancer audit through the designated cancer centre.

   g. the satellite unit has a named lead surgeon responsible for rectal cancer surgery and for coordination of services between the satellite unit and the designated cancer centre.

   h. the satellite unit agrees to work towards full integration of rectal cancer surgery services into the designated cancer centre in a phased manner and on an agreed timetable

1.5 **Implementation and Evaluation of Recommendations**

The National Cancer Control Programme (NCCP) has designated eight cancer centres, namely Beaumont Hospital, Cork University Hospital, Limerick Regional Hospital, Mater Misericordiae University Hospital, St James' Hospital, St. Vincent's University Hospital, University College Hospital Galway and Waterford Regional Hospital. Each of these hospitals should provide rectal cancer surgical services.

In addition, the 2007 RCSI National Rectal Cancer Surgery Audit shows that more than 20 rectal cancer resections per annum were performed in each of 5 further hospitals. These hospitals are the Adelaide and Meath Hospital (incorporating the National Children's Hospital), Connolly Hospital, Mayo General Hospital, Mercy University Hospital and Wexford General Hospital. These hospitals should continue to provide rectal cancer surgical services as satellite units.

Implementation of these recommendations, based on data from the 2007 RCSI National Rectal Cancer Surgery Audit, will reduce the number of hospitals providing rectal cancer surgical services from 31 in the

2007 audit down to 13 immediately. Phased reduction of the number of satellite units from the initial number of 5 should occur as soon as feasible.

The 2007 RCSI National Rectal Cancer Surgery Audit, although limited in scope, clearly demonstrates the value of national surgical audit. **Development of prospective audit systems is a necessary part of the rationalisation of rectal cancer services and should be prioritised for investment and development to allow evidence-based evaluation of service quality and future development of rectal cancer surgical services.**

1.6 **Rectal Cancer Expert Working Group**

A working group was established to develop a common framework of management for patients with colorectal cancer. The group was convened by the Secretary of the Irish Association of Coloproctology at the request of Prof. Tom Keane, Director of the National Cancer Control Programme. Each cancer centre was represented in this group and the President of RCSI (or his/her designate) was invited to represent the interests of non-designated cancer centres. Members of the Rectal Cancer Expert Working Group are identified in Appendix 2.

The aims of the group were to agree appropriate standards of care for rectal cancer that could be adopted in all cancer centres and to identify performance indicators to allow meaningful and relevant audit structures to be developed for the purpose of quality assurance.

The current standards of care in relation to colorectal cancer in the UK and Ireland have been agreed in the evidence-based document The Guidelines for the Management of Colorectal Cancer (3rd edition) 2007 of the Association of Coloproctology of Great Britain and Ireland (ACPGBI). Representatives of the Irish Chapter of the ACPGBI and the RCSI were involved in the multidisciplinary group that drafted these guidelines (Appendix 3). As all members of the IACP are also members of the Irish Chapter of the ACPGBI, practicing colorectal surgeons are aware of these guidelines and implement them in their usual practice, insofar as this is possible. It was agreed, however, that the ACPGBI Guidelines for the Management of Colorectal Cancer (3rd edition) 2007 were particularly relevant to medical practitioners working in the NHS. The Irish healthcare system, under the direction of the Minister, the Department of Health and the Health Services Executive, differs in many profound ways from that of the NHS. It was agreed that review and rewriting of the guidelines should be undertaken to accommodate structures and practice in the Irish Health service as well as advances in therapy since the publication of the 2007 document. The IACP and the Irish chapter of the ACPGBI wish to acknowledge the contribution of members of the ACPGBI who were involved in the development of the original guidelines (Appendix 3), which form the cornerstone of our own.

1.7 **Prerequisites for a Functioning Specialist Rectal Cancer Centre**

1.7.1 **Introduction**

The National Cancer Control Strategy highlights the necessity of “equity of access to services and equality of patient outcome irrespective of geography”. Delivery of a high quality rectal cancer surgery service

requires development of centres of excellence with teams of surgeons and support staff working together in appropriately resourced facilities to ensure that patients receive the quality service that they deserve. A detailed consideration of this topic is available in **Resources for Coloproctology**, a publication of the Association of Coloproctology of Great Britain and Ireland. The IACP believes that patients with complex benign and malignant colorectal conditions should continue to be treated in colorectal specialist units. Patients with rectal cancer require the full range of services available in a fully functioning colorectal surgery department.

The staffing requirements therefore presume that each Centre will cater for a population of circa 500,000 and that each Centre will continue to treat complex benign disease. All numbers refer to minimum necessary staffing and resource levels for a modern, efficient, internationally accredited Centre.

1.7.2 **Staffing**

1.7.2.1 Consultant Staffing

Consultant Colorectal Surgeon x 8

Consultant Gastroenterologist with an interest in coloproctology x 4

Consultant Specialist Radiologist x 4 (to include Interventionalists x 2)

Consultant Specialist Pathologists x 2

Consultant Specialist Medical Oncologist x 2

Consultant Specialist Radiation Oncologist x 2

A named Lead Consultant for rectal cancer in each discipline is required and each discipline must have sufficient non consultant hospital doctor (NCHD) staff. Adequate consultant sessions must be allocated

to ensure adequate consultant input to each of the following: patient care activities, teaching, research, audit, clinical management, administration, directorate activities, participation in national and international committees and continuing professional development.

A designated National Colorectal Cancer Genetics Service, staffed by two full time Consultant Geneticists, is required. Each cancer centre will have a colorectal cancer genetics clinical nurse specialist to refer appropriate patients to the national service.

1.7.2.2 Colorectal Surgical Support Staffing

Non consultant Hospital Doctors (NCHDs)

Colorectal Fellows x 2 (following completion of Specialist Registrar training)

Specialist Registrars x 4

Appropriate levels of SHOs and interns to support all activities of the service and to run a European working time directive compliant roster.

1.7.2.3 Colorectal Nurse Specialists

Colorectal Cancer Nurse Coordinators

1 colorectal cancer nurse coordinator per 50 colorectal cancers treated

Stoma & Wound Care Nurse Specialists x 2

IBD nurse specialist x 2

Genetics nurse specialist x 1

Pain Management x 1 (acute/chronic pain/epidural service)

Palliative Care x 1

1.7.2.4 Dedicated Colorectal Administrative Staff

Grade 5 x 6 (to cover OPD, Endoscopy and Wards)

Colorectal Data Manager x 2

Data Collator x 2

Multi Disciplinary Meeting clerks x 2

1.7.2.5 Medical Scientific staffing

Medical Scientist x 2 (Pathology, of which one should have an interest in molecular pathology)

Technician x 2 (Physiological measurement x 2)

1.8 Infrastructure & Equipment

1.8.1 Radiological

MRI	10 sessions per week per centre
CT	10 sessions per week per centre
PET / CT	1 per 2 rectal cancer centres
Endoanal/rectal U/S	available in every centre
Anorectal Physiology Laboratory	available in every centre

1.8.2 **Out-Patient Management**

5 Clinics per week of 3 hours each (2 for new patients and 3 for return patients)

Each staffed by 2 Consultant Surgeons, 2 SpRs and 2 Colorectal Nurse Specialists (1 Colorectal Cancer Co-ordinator and 1 Stoma & Wound Care).

Full outpatient facilities for preoperative education and stoma education as well as anaesthetic pre-assessment clinics.

1 Administrative assistant appointments/correspondance etc.

1 Administrative assistant data collection / collation

1.8.3 **Audit infrastructure**

Each rectal cancer centre must have IT infrastructure and staffing to support data collection, data entry and analysis of relevant outcome parameters including but not limited to the key performance indicators outlined in this document. In addition each rectal cancer must have administrative support to participate in the ACPGBI colorectal cancer audit, national audit and submission of data to the national cancer registry.

1.8.4 **Endoscopy**

Minimum 1000 scopes per year per Cancer Centre

5 sessions per week diagnostic and 3 sessions per week therapeutic

1.8.5 **Ward facilities**

Ward Facilities with access to all of the following in each centre:

1 day beds, 5 day beds, 7 day beds

Dedicated High Dependency Unit and Intensive Care Unit

1.8.6 **Operating Theatre**

2 theatres all day x 5 days per week with appropriate Consultant Anaesthetic cover

All theatres fully equipped for Open & Laparoscopic Surgery, TEMS 1 unit per 4 rectal cancer centres

Availability of an Emergency theatre 7 days per week with appropriate Consultant Anaesthetic cover

Provision for most urgent cases to be done between 8am and 6pm

1.9 **The Rectal Cancer Multidisciplinary Team**

A fully functioning multidisciplinary team (MDT) must be available on site in every designated Rectal Cancer Specialist Centre. This team must meet at least weekly and such meetings should be attended by all members as a priority. Records of all team decisions must be kept and appropriate audiovisual facilities should be available to allow the smooth running of the meeting. A facility for remote access to the meeting should exist` to enable referring hospitals and other specialists to participate when necessary.

Each multidisciplinary meeting should include:

• At least two specialist colorectal surgeons who have been trained in, and maintain a special interest in, techniques relevant to colorectal cancer, and who can demonstrate a high level of skill in this area. Each surgeon in the colorectal MDT should carry out a minimum of 20 colorectal resections per annum. Subspecialisation should be encouraged among surgeons who treat patients with rectal cancer.

• Medical oncologist with colorectal expertise

• Radiation oncologist with colorectal expertise

• Diagnostic radiologist with colorectal expertise.

• Histopathologist with colorectal expertise.

• Skilled colonoscopist of any discipline (who may be the colorectal surgeon, another surgeon or a gastroenterologist).

• Colorectal nurse specialists (CNS) who should be available to provide support, assistance, information and advice to every patient. She/he should have specific expertise in colorectal cancer and in addition, should be trained in communication skills and counseling. These nurses should ensure that patients' non-clinical needs – for example, for information and support – are met.

• Palliative care specialist (doctor or nurse), who should work with palliative care services in the community.

• Meeting coordinator, who should take responsibility for organising MDT meetings and recording decisions taken at such meeting in the patient's medical records. The co-ordinator should have the authority to ensure that extended team members such as social workers and psychologists are available when required. The co-ordinator should also be responsible for feedback about patients referred to more specialised teams (such as for liver resection) and the return of such patients to the local colorectal cancer MDT. The coordinator is responsible for ensuring that all clinical material (notes, x-rays, other results) is available for the MDT

• Team secretary who will provide clerical support for the MDT, recording all decisions made by the team and communicating appropriate information promptly to all those (such as GPs) who may require it. In smaller teams, the co-ordinator may take the role of team secretary.

1.9.1 **Extended Multidisciplinary Team**

MDTs should maintain close contact with other professionals who are actively involved in supporting the patient or carrying out the treatment strategy decided by the core team known as the extended team. Extended teams should include the following members:

- Gastroenterologist with colorectal and luminal expertise
- Interventional radiologist with colorectal expertise
- Liver surgeon who is a member of a liver resection MDT and can advise the colorectal cancer MDT
- Gynaecologic oncologists
- Urologic oncologists
- Thoracic surgeon with expertise in lung resection
- GPs/primary care teams
- Dietician
- Liaison psychiatrist/clinical psychologist
- Social worker
- Clinical geneticist/genetics counsellor
- Clinical trials co-ordinator or research nurse

Selected individuals from the extended team may be included in the core team. The availability of expertise in insertion of lower intestinal stents is mandatory in every rectal cancer centre.

A detailed consideration of the principles and practice of multidisciplinary care is provided in Appendix 4.

2 Quality Assurance Guidelines for the Management of Rectal Cancer in Ireland

2.1 Introduction

Colorectal cancer is a varied disease with many different presentations and a wide range of treatments. Gastrointestinal symptoms are among the most common symptoms reported by patients attending their family doctors. Distinguishing the patient who requires special investigation to exclude a colorectal cancer from the many whose symptoms are caused by haemorrhoids, irritable bowel, poor diet and literally hundreds of other causes is merely the first challenge. Even after accurate diagnosis of cancer, huge variation in possible treatment exists. A successful cure may require a 2mm polypectomy or a multivisceral resection with faecal and urinary diversion or any one of a range of procedures in between. Common to all treatments is the need to provide care of the highest quality, consistent with international standards, delivered in a way that is accessible, effective and efficient. Institutions providing services to patients with colorectal cancer must demonstrate a culture that is patient focused, with a commitment to cancer research and a willingness to continuously improve. This can only be achieved through audit of services provided to cancer patients. Investment in audit infrastructure and dedicated colorectal cancer audit staff in every designated cancer centre is a prerequisite to providing a quality assured service.

The purpose of guidelines is not intended to create a rigid framework where reasonable difference of opinion exists, but to help to set standards of care. In a disease as complex as rectal cancer, it is expected that variations in individual practice may occur from time to time. Such variations should ideally be documented with supporting evidence for the variant decision to demonstrate reflective practice and to facilitate areas for future research. Whenever possible, rectal cancer patients should be considered for inclusion in randomised trials to allow areas of uncertainty to be addressed with scientific rigour so that future practice may be evidence based. Participation in national audit and clinical trials can help identify areas of best practice which can then be disseminated to improve patient care for all.

Measuring performance is best achieved by concentrating on outcomes that directly reflect the patient journey and that are clinically relevant. The purpose of rectal cancer services is to cure rectal cancer in as many patients as possible in a way that enhances their functional outcome to the maximal extent while reducing adverse outcomes to the lowest possible level. In every instance, care must be delivered in a way that maximizes respect for the dignity of the individual and their right to quality care in a supportive environment.

In a climate of restricted resources, prioritization of key performance indicators is essential to provide robust quality assurance without reducing the amount of time and resource available for provision of direct patient care activities. A balance must be achieved between measuring the quality of a service in a holistic way versus measuring every individual aspect of a service at the expense of the whole. The Rectal Cancer Working Group devoted significant time to **prioritisation of key performance indicators that have the potential to measure the most important aspects of clinical care of patients with rectal cancer in the most efficient manner**. These are highlighted in Appendix 5. Many more possible outcome measures were considered but this dataset was selected to allow generation of a universally applicable,

meaningful minimum dataset that would enhance care by allowing focused intervention so that the audit cycle may be completed. **Investment in infrastructure and staff to allow this level of audit in each cancer centre is a prerequisite to its implementation.** It should be noted that the current performance indicators focus on surgical treatment and diagnosis and similar key performance indicators will be necessary for other therapies including chemotherapy and radiotherapy.

2.2 **Identification of Patients for Referral**

When a person is concerned about possible colorectal cancer and the GP feels investigation is appropriate, it is important that this is done promptly. Although there is little evidence that reducing delay between diagnosis and treatment improves survival, delay causes considerable psychological morbidity which makes it harder for patients and their families to cope with their disease, especially if it is incurable. It is important to develop management strategies which ensure that time lags before referral, diagnosis and treatment are kept to a minimum. Some delays, however, are unavoidable. These include the diagnostic process, which incorporates 'treat, watch-and wait' strategies by both patients and GPs, the time taken for appointments to be arranged, the time for diagnostic investigations and staging of the cancer, optimising the patient's general health for surgery, and the time required to arrange for admission and operation, ensuring that adequate facilities (such as high dependency or intensive care beds) are available when necessary.

The management of patients with low risk symptoms should aim to avoid unnecessary referral to hospital of patients with transient symptoms from benign disease. This will conserve diagnostic resources, so that they are available for more rapid investigation of patients who are more likely to have colorectal cancer.

The present guidelines refer specifically to rectal cancer, but similarity of symptoms between rectal and sigmoid cancer means that many patients with sigmoid and other colon cancers will be assessed and treated in a rectal cancer centre. **Rectal cancer is defined as a tumour of the bowel where the lower border of the tumour is within 15cm of the anal verge on rigid sigmoidoscopy.** The National Cancer Control Programme has instructed that patients with rectal cancer should be treated by a colorectal surgeon in a designated rectal cancer centre. Patients with colon cancer may also benefit from care by a colorectal surgeon and as a minimum should be treated by a general surgeon who is experienced in the care of patients with colon cancer.

Most patients with rectal and sigmoid cancers present with a combination of rectal bleeding and an altered bowel habit, usually increased frequency of defaecation and/or looser stools. Smaller numbers of patients present with only one of these symptoms. Other symptoms may include tenesmus, mucous per rectum and weight loss. There is a palpable rectal mass in many patients with rectal cancer and more than 80% of palpable rectal cancers may be detected by GPs. These patients can be identified by GPs for fast-track referral. A digital rectal examination should therefore be an essential part of the examination of any patient presenting with lower GI symptoms above the age of 40 years, and of anybody below this age with persistent symptoms. A small cancer at the anorectal junction which may be missed by endoscopy can often be detected by rectal examination. Vaginal examination should be part of the

assessment of suspected rectal cancer in women. It is likely that a right-sided abdominal mass will be of greater diagnostic value than left-sided, in view of the higher prevalence of a palpable sigmoid colon. When there is uncertainty about the cause of an abdominal mass, the patient should be treated with laxatives and re-examined to establish whether the mass is persistent before referral.

2.2.1 **General recommendations**

• A patient who presents with symptoms suggestive of rectal or anal cancer should be referred for investigation.

• In patients with equivocal symptoms who are not unduly anxious, it is reasonable to use a period of 'treat, watch and wait' as a method of management.

• In patients with unexplained symptoms related to the lower gastrointestinal tract, a digital rectal examination should always be carried out, provided this is acceptable to the patient.

• Only patients with new and persistent symptoms listed below should be referred to the fast-track system. These criteria would be expected to identify over 80% of all colorectal cancers presenting to Outpatients.

2.2.2 **High Risk Criteria:**

• In patients aged 40 years and older, reporting rectal bleeding with a change in bowel habit towards looser stools and/or increased stool frequency persisting for 6 weeks or more, an urgent referral should be made.

• In patients aged 60 years and older, with rectal bleeding persisting for 6 weeks or more without a change in bowel habit and without anal symptoms, an urgent referral should be made.

• In patients aged 60 years and older, with a change in bowel habit to looser stools and/or more frequent stools persistent for 6 weeks or more without rectal bleeding, an urgent referral should be made.

• In patients presenting with a right lower abdominal mass consistent with involvement of the large bowel, an urgent referral should be made, irrespective of age.

• In patients presenting with a palpable rectal mass (intraluminal and not pelvic), an urgent referral should be made, irrespective of age. (A pelvic mass outside the bowel would warrant an urgent referral to a urologist or gynaecologist.)

• In men of any age with unexplained iron deficiency anaemia and haemoglobin of 11 g/100 ml or below, an urgent referral should be made.

• In non-menstruating women with unexplained iron deficiency anaemia and haemoglobin of 10 g/100 ml or below, an urgent referral should be made.

'Unexplained' in this context means a patient whose anaemia is considered on the basis of a history and examination in primary care not to be related to other sources of blood loss (for example, non-steroidal anti-inflammatory drug treatment or blood dyscrasia).

2.2.3 **Low risk criteria**

Screening studies show that the risk of having bowel cancer is never zero, even in patients without symptoms. Some cancers will be found incidentally in patients presenting with symptoms from benign disease, and symptomatic cancers can develop in patients who already have symptoms from functional bowel disease or piles. This means that patients with persistent low-risk symptoms which do not respond to treatment, or which recur after stopping treatment, should be referred to routine clinics.

Criteria indicating that patients are at low risk of colorectal cancer are:

• Rectal bleeding with anal symptoms or with an obvious external visible cause such as prolapsed piles, rectal prolapse and anal fissures.

• Transient change in bowel habit for less than 6 weeks, particularly if to decreased frequency of defaecation and harder stools

• Abdominal pain in the absence of iron deficiency anaemia or an easily palpable abdominal mass, and not associated with loss of appetite causing weight loss or other higher risk symptoms.

• When patients have persistent symptoms which would normally fit low-risk criteria, but there are other worrying factors such as a positive family history or a positive FOB, they should be seen on an urgent basis in a normal clinic.

2.3 **Investigations for the Diagnosis of Colorectal Cancer**

This section refers to investigation of patients presenting electively for investigation of possible colorectal cancer. Investigation of patients presenting with obstructing colorectal cancers will be considered in a separate section.

Patients presenting electively with symptoms suggestive of colorectal cancer should have a physical examination, including digital rectal examination and faecal occult blood testing. A small anorectal carcinoma at the anorectal junction is easily missed without a careful digital rectal examination.

Complete examination of the large bowel can be achieved by colonoscopy, CT colonography or adequate endoscopic visualization of the rectum plus a double contrast barium enema. Colonoscopy is generally considered the gold standard for the investigation of suspected colorectal cancer because it allows both histologic diagnosis and some therapeutic procedures. Colonoscopy should be performed to a high standard, in accordance with the recommendations of the Irish Society of Gastroenterology and JAG guidelines (Appendix 6). The endoscopist should be prepared to biopsy or remove appropriate lesions and inject some form of permanent dye to mark the site of any significant polypectomy. In patients where colonoscopy is incomplete or has failed, CT colonography or double contrast barium enema

should be performed to examine the whole bowel. Double contrast barium enema should always be complemented by endoscopy, normally flexible sigmoidoscopy, due to the risk of missing small sigmoid polyps. There is some evidence that barium enema is less accurate than CT colonography in the detection of synchronous cancers. It must be accepted, however, that all investigations may vary in quality, and the choice between colonoscopy, barium enema and CT colonography for total colonic examination will also depend on local availability and expertise. Certain minimum levels of quality must be met for all investigations, whether they take place in a designated cancer centre or not (Appendix 6).

Every patient with suspected rectal or sigmoid colon cancer, and all patients with tumours within 35cm of the anal verge on flexible endoscopy, should have rigid sigmoidoscopy. Patients where the lower border of the tumour is less than 15cm from the anal verge should be referred to a colorectal surgeon at a designated Rectal Cancer Specialist Centre. If a potentially curable rectal cancer is detected by sigmoidoscopy, it is important that complete visualisation of the colon is achieved either pre- or post-operatively, as the incidence of synchronous lesions is in the order of 4-5%. If complete colonic visualization is not possible before surgery, it is important this is done at the earliest possible time post-operatively. The diagnosis of rectal cancer should normally be confirmed by histology. Histological confirmation of neoplasia should be considered mandatory, in all but exceptional cases, when surgery might result in either a permanent stoma or an ultra-low anterior resection, or when pre-operative radiotherapy or chemotherapy is being administered.

2.4 **Referral to a Designated Rectal Cancer Specialist Centre and Access to Treatment**

Systems of referral to rectal cancer centres should be standardised nationally and **web-based electronic referral systems should be implemented as a priority**. Patients should be referred to a designated Rectal Cancer Specialist Centre promptly upon diagnosis of rectal cancer. The referral of patients should not be delayed for further staging investigations but instead the performance of staging investigations should be coordinated by the Rectal Cancer Nurse Specialist in the designated Rectal Cancer Specialist Centre to which the patient has been referred. Such investigations may take place in either a local non-designated hospital or in the specialist centre, depending on individual circumstances. The number of visits to hospital and the distance travelled by the patient should be minimized whenever possible. Patients diagnosed with rectal cancer should be seen at a specialist centre promptly, and ideally within two weeks of receipt of a referral.

Patients should commence treatment for their cancer in a timely fashion, bearing in mind that each case must be discussed at a preoperative multidisciplinary meeting in all but the most urgent cases. In some cases a patient may be medically unfit and require specific medical treatment prior to rectal cancer treatment. In other cases the patient may be receiving medication (such as anticoagulant treatment) that requires particular management in the perioperative period. Each patient should have access to a named Rectal Cancer Nurse Specialist who will intervene on the patient's behalf to minimize delays experienced due to the need for necessary non-cancer related investigations, specialist opinions and therapy. The right of an individual patient to defer their treatment must also be respected.

2.5 Investigations for the Preoperative Staging of Rectal Cancer

Survival and clinical outcomes following treatment of colorectal cancer are markedly affected by the local extent of the disease, whether the lymph nodes are involved, whether the disease is disseminated, and by surgical technique.

Accurate determination of the position of a rectal tumour is a critical step in selecting an appropriate operative strategy. **Every patient with rectal cancer should have a rigid sigmoidoscopy performed by a consultant colorectal surgeon to measure the distance of the tumour from the anal verge prior to any therapeutic intervention. This distance should be clearly recorded to the nearest centimetre.**

The degree of local extension determines whether a curative resection is possible and whether preoperative radiotherapy should be considered. High resolution MRI (1.5 Tesla) should be undertaken to assess pelvic and mesorectal nodal involvement and the proximity of the tumour to the circumferential resection margin. Size, morphology and number of nodes as well as distance from the tumour to the circumferential resection margin (in mm) should be reported. Although nodal size alone is an unreliable guide to tumour involvement, lymph nodes > 1cm in diameter are more likely to contain tumour and the majority of involved lymph nodes in colorectal cancer specimens measure >5mm. Future advances in MRI may improve accuracy of preoperative staging.

Rectal endosonography is particularly valuable in early tumours and where local excision is being considered, staging by endorectal ultrasound (U/S) scanning is recommended to determine the depth of tumour penetration (T stage). Some other patients may also benefit from preoperative endorectal or endoanal U/S to evaluate their tumour or anal sphincter.

Preoperative staging MRI and endorectal ultrasound scanning should normally be performed in the designated Rectal Cancer Specialist Centre for quality assurance purposes, to allow development of multidisciplinary specialist radiologic expertise in rectal cancer and to facilitate the personal involvement of the Consultant Radiologist in the preoperative MDT meeting where determination of the treatment strategy will be agreed.

Pre-operative staging using a CT scan of the thorax, abdomen and pelvis should be normal practice except in cases where information on cancer stage and metastatic spread would have no influence on management or in patients with peritonitis who require emergency surgery. In some circumstances, it may be appropriate for patients to have CT performed in their local hospital provided standardized protocols are followed.

Patients with indeterminate lesions or atypical primary rectal cancer may benefit from PET scanning. Patients who are considered candidates for an extended resection (such as *en bloc* sacrectomy or pelvic exenteration) and all patients undergoing elective surgery for recurrent colorectal cancer should have a PET scan.

Preoperative investigations should be coordinated by the Rectal Cancer Nurse Specialist in the designated Centre.

2.6 **Assessment of Family History**

It is well established that heritable factors make a significant contribution to an individual's risk of colorectal cancer. These factors can be considered in two broad groups. The first group are high penetrance (usually autosomal dominant) inherited syndromes, notably familial adenomatous polyposis coli (FAP) and hereditary non-polyposis colorectal cancer (HNPCC), which account for fewer than 5% of all colorectal cancers. The second group consists of patients with inherited risk for colorectal cancer which may be identifiable clinically through clustering of colorectal cancers within families. The mode of inheritance of this second, larger, cohort is multifactorial and incompletely understood but several genes are likely to be involved, and this mode appears to predispose to adenomatous polyp formation as well as cancer.

People recognized at increased risk of colorectal cancer due to high penetrance genetic disorders are identified by recognition of a family history of colorectal cancer that fulfils empiric criteria, the presence of pathognomonic clinical or pathological features or by identification of a molecular genetic defect in an affected proband or relative. Collectively, such cases account for a small proportion (3-5%) of all cases of colorectal cancer. However, the absolute cancer risk is very high and so surveillance is necessarily intensive. Guidance on the management of people in these high-risk categories is qualitatively distinct from that recommended for people fulfilling low or moderate risk criteria, and this is reflected in the recommendations for the two risk categories. It is mandatory that a thorough family history is recorded for every patient receiving treatment for rectal cancer. The provision of an appropriately staffed national colorectal cancer genetics service is critical. The national service should be supported by a network of clinical nurse specialists with an interest in genetics to provide direct patient interface.

Although there are other, very rare, syndromes associated with excess colorectal cancer risk, specific guidance in this document is restricted to discussion of hereditary nonpolyposis colorectal cancer (HNPCC), familial adenomatous polyposis (FAP), MYH associated polyposis (MAP), juvenile polyposis syndrome (JPS) and Peutz-Jeghers syndrome (PJS).

Detailed guidance on assessment and management of patients considered to be affected by a genetic predisposition is included in Appendix 7.

2.7 **Treatment of Patients with Rectal Cancer in the Designated Rectal Cancer Specialist Centre**

Centralisation of services to Designated Rectal Cancer Specialist Centres should improve standards of care, cancer-related outcomes and enhance the quality of services available to patients. Availability of a multidisciplinary team to all patients receiving treatment for rectal cancer is the cornerstone of practice in such centres. Given the primacy of surgery in the curative treatment of colorectal cancer, this document necessarily focuses to a greater extent on the discipline of surgery but all members of the rectal cancer multidisciplinary team should ensure that their standards of practice meet international norms, that they audit their practice and that due attention is paid to their continuing professional development. Patients with rectal cancer should be under the care of a named colorectal surgeon and have access to a colorectal nurse specialist for advice and support from the time they receive their

diagnosis. **Every patient with a diagnosis of rectal cancer should have the benefit of a colorectal surgical opinion before treatment is commenced, even if their treatment strategy may not include primary surgery, and their management should be discussed by the multidisciplinary team.**

Surgery for colorectal cancer should be avoided if the hazards are deemed to outweigh the potential benefits, such as when a patient is medically unfit for surgery or 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 specific guidelines; in making such a decision it is important that the role of surgery in palliation has been considered and that the patient and their close relatives are involved in the decision making process to ensure the underlying reasoning is clear and acceptable to all concerned. Objective evaluation of operative risk in colorectal cancer surgery may be facilitated by the use of statistical models which take patient co-morbidity into account, such as the P-POSSUM, CR-POSSUM and Cleveland Clinic scoring systems. This can be useful in pre-operative counselling of patients and their carers, as a part of the process of informed consent. The ACPGBI recommends that surgeons should expect to achieve an operative mortality of less than 20% for emergency surgery and less than 7% for elective surgery for colorectal cancer, although this guideline covers all patients with colorectal cancer and not just those undergoing rectal cancer surgery, which is generally considered to carry higher risk. **Participation in ACPBGI colorectal cancer audit is a requirement for all designated rectal cancer centres.** The IACP believes that both colon and rectal cancer outcomes should be subject to audit.

Wide variations between individual surgeons in terms of rates of curative resection, operative mortality, anastomotic leak, local recurrence and survival have been reported in the literature, even when adjusted for patient-related risk factors. As a general rule, the more complex the operation, the greater the surgical skill required; such skill is acquired and developed through specialised training and experience and maintained by regular practice. It is anticipated that the trend to subspecialisation, increased caseload per surgeon and changes in surgical training will increase the development of surgical expertise. A surgical training programme for rectal cancer in Stockholm reduced the permanent stoma rate and local recurrence rates, and 5 year cancer-specific survival rates increased as a result of the total mesorectal excision project. Surgery for rectal cancer should only be carried out by colorectal surgeons with appropriate training and experience, working as part of a multidisciplinary team. **Focused continuing medical education (CME) for rectal cancer surgeons should be supported by the National Cancer Control Programme.**

2.8 **Preoperative Rectal Cancer Multidisciplinary Team Meeting**

Significant improvements in the locoregional control of resectable rectal cancer have been achieved by a multidisciplinary team (MDT) approach which includes accurate preoperative staging, total mesorectal excisional (TME) surgery and proforma pathology reporting, particularly the recognition that achieving a clear circumferential resection margin (CRM) is the primary aim of the team. The multidisciplinary team is a critical component of modern rectal cancer care. A detailed review of the MDT and the roles of it's members is included in Appendix 4. The addition of radiotherapy or chemoradiotherapy (CRT) may improve locoregional control. However the benefits of short course preoperative radiotherapy (SCPRT)

are modest and must be balanced against the risk of acute and long-term toxicity. Radiation should be administered preoperatively to reduce morbidity, with postoperative radiation of rectal cancer a rarity.

In broad terms, patients will be stratified into three categories (early stage, intermediate stage and advanced stage) as the result of the MDT meeting but management decisions for individual patients will be determined by specific patient factors. The potential risks and benefits of preoperative radiation and chemotherapy should be considered at the preoperative MDT meeting for every patient with rectal cancer. Such therapy is most likely to be beneficial in patients where the circumferential resection margin is predicted to be positive on preoperative MRI but may also be valuable in T3/4 or node positive tumours. Lower rectal cancers are the most difficult to manage as the ability of MRI to predict the CRM is less accurate and the quality of surgical resection is more unpredictable. These patients are at considerable risk of under-treatment and yet at the same time, risk being over-treated.

Following the decision of the preoperative MDT meeting, patients will either be referred for neoadjuvant radiotherapy and /or chemotherapy or will proceed directly to surgery. Radiotherapy should commence within 2 weeks of referral from the MDT meeting. Patients with resectable rectal cancer should be considered for preoperative short course radiotherapy (25Gy in 5 fractions in 1 week) with surgery performed within 1 week of completion of radiation. However, in certain cases the MDT may decide that the benefits of treating patients with lower risk disease will not justify the additional toxicity of radiotherapy. When local staging indicates that radiotherapy (with synchronous chemotherapy) would be appropriate to downstage the tumour, a dose of 45Gy in 25 fractions over 5 weeks, with or without a reduced volume boost dose of 5.4-9Gy in 3-5 fractions, is recommended. A planned radiotherapy volume using three or four fields given pre-operatively is recommended for rectal cancers as this results in less morbidity and mortality.

MDTs should prospectively audit the outcomes of all patients with rectal cancer managed by the team in terms of curative resection rate (R0), postoperative morbidity and mortality, locoregional recurrence and overall survival. Prospective audit within each MDT will provide invaluable evidence on the effectiveness of the treatment selection policies adopted.

2.9 **Preoperative (Neoadjuvant) Radiotherapy**

All patients should be made aware of the common and serious short and long term side effects of radiotherapy and chemotherapy, the expected benefits and the other options available, before treatment begins.

Preoperative radiotherapy is usually delivered either by conventional fractionation (long course preoperative radiotherapy, LCPRT) or short course preoperative radiotherapy (SCPRT). The former method is used to shrink the tumour before resection (known as “downstaging”), whilst the latter is used to reduce the risk of local recurrence.

Long course radiotherapy consists of doses ranging from 45-50 Gy in 25 daily fractions over 5 weeks followed by surgery 4-8 weeks after completion of radiotherapy, allowing maximal tumour shrinkage. This is more effective with the addition of synchronous 5FU-based chemotherapy, which is given either

on the first and fifth week of radiotherapy or as a continuous infusion throughout the duration of radiotherapy, otherwise known as chemoradiotherapy (CRT). Short course radiotherapy delivers a lower dose, 25 Gy, but within a short duration of 5 daily fractions over 1 week. Surgery is performed on the following week, before the onset of acute side-effects of radiotherapy. The short interval between commencing radiotherapy and surgery (usually less than 10 days) means that SCPRT does not achieve any significant tumour shrinkage prior to surgical resection. It is therefore appropriate only for patients with rectal cancers which are clinically and radiologically assessed to be resectable.

The trial which most significantly influenced surgical and oncological practice in the late 1990's was the Swedish Rectal Cancer Trial. One thousand one hundred and sixty eight patients with resectable rectal cancer were randomised to receive SCPRT followed by surgery or surgery alone (Swedish Rectal Cancer Trial 1997). The use of SCPRT reduced the risk of local recurrence from 27% to 11% at 5-years ($p<0.001$) and improved the 5-year overall survival from 48% to 58% ($p=0.004$). These benefits were maintained for a prolonged period (median follow-up 13 years) (Folkesson et al 2005 Ib). Since publication of the Swedish Rectal Cancer Trial results, significant progress has been made in the multidisciplinary management of rectal cancer. Firstly, the observation that achieving wide circumferential resection margins (CRM) around the tumour improves local control and overall survival has been widely accepted. Secondly, the practice of total mesorectal excision (TME) surgery has become the standard of care in rectal cancer surgery. As a result, local recurrence following surgery has fallen significantly, with single centre series reporting figures as low as 3%-6% after TME alone raising the question of whether or not there was any role for SCPRT in addition to optimal TME surgery.

In response to this question, the Dutch Colorectal Cancer Group randomised 1861 patients to SCPRT followed by TME surgery or TME surgery alone. Patients who were found to have an involved CRM following TME alone were to receive postoperative radiotherapy. This trial showed that the addition of SCPRT to TME reduced the risk of local recurrence from 8.2% to 2.4% at 2-years ($p<0.001$) (Kapiteijn et al 2001 III) and from 11.4% to 5.8% at 5-years (Marijnen et al 2005 III). There was no difference in overall survival (63.5% vs 64.3% at 5years; $p=0.87$). The UK MRC CRO7 trial was similar in design to the Dutch TME trial, but differed in several respects. Firstly, although TME surgery was not a protocol requirement, it was performed in 93% of the patients randomised. Secondly, the control arm was not surgery alone but selective postoperative CRT (45 Gy in 25 fractions with synchronous 5FU) in CR07, compared with post-operative radiotherapy alone in the Dutch trial. A total of 1350 patients were entered between March 1998 and August 2005. The early data from CR07 confirms than the addition of SCPRT to TME reduces local recurrence from 11.1% to 4.7% at 3 years and improves disease free survival from 74.9% to 79.5% ($p=0.031$) (Sebag Montefiore et al 2006 Ib). In the event of a patient being found to have an involved CRM following SCPRT and TME surgery, further radiotherapy given postoperatively is contraindicated. The risk of long-term radiation toxicity associated with this approach is considerable (84% at 5-years) (Svoboda et al 1999 IIb).

By adopting a policy of offering SCPRT to all patients with resectable rectal cancer, the major concern is that for a relatively low percentage absolute reduction of local recurrence rate (approximately 6%), many patients have been exposed to the risk of long-term toxicity associated with the addition of

radiotherapy. Is it possible to select specific sub-groups of patients who may have a greater probability of benefiting and to avoid treating sub-groups who may not benefit?

Data from both Dutch TME and CR07 trials suggest that the greatest benefits of SCPRT were in patients with mid rectal tumours (5-10 cm from the anal verge) (1.0 vs 10.1%; p<0.001 and 4.9% vs 9.9%; p=0.017 respectively) and those with lymph node involvement (4.3% vs 15.0%; p<0.001 and 9.0% vs 17.4%; p=0.008) (Kapiteijn et al 2001 III; Marijnen et al 2003 III; Sebag Montefiore et al 2006 Ib). The numbers needed to treat in order to prevent one local recurrence varies from 9-20 patients.

The relative reduction in local recurrence for patients undergoing abdominoperineal resection (APR) (4.9% vs. 10.1%; p=0.02 and 8.3% vs 9.3%; p=0.397 for the Dutch TME and CR07 respectively) was smaller than those undergoing anterior resection (1.2% vs. 7.3%; p<0.001 and 2.4% vs 12.0%; p<0.0001 respectively). However, this would have been confounded by the fact that a significant percentage (29% and 17% respectively) of APR patients had an involved CRM, leading to a high risk of local recurrence (Nagtegaal et al 2002 Ib). The use of SCPRT did not influence the risk of local recurrence if the CRM was involved (1mm or less), 9.3% vs16.4%; p=0.08 and 17% vs 10%; p=0.360 for the Dutch and CR07 trials respectively (Marijnen et al 2003 III, Sebag-Montefiore et al 2006 Ib). Postoperative radiotherapy or CRT has not been shown to compensate adequately for an involved CRM in either trial.

In the Dutch TME trial, no benefit from SCPRT was seen in upper rectal tumours (10-15 cm from the anal verge) (1.3% vs 3.8%; p=0.170) but CR07 reported a significant reduction of local recurrence (1.4% vs 16.5%; p=0.002). In CR07, the vast majority of tumours in this group were between 10 and 12 cm. It is recognised that the quality of TME surgery as defined by an intact mesorectal fascia is predictive of local recurrence risk (Nagtegaal et al 2002; Quirke et al 2006) and this appears independent of CRM status. The CR07 trial showed that despite good quality TME (grade 3), the addition of SCPRT virtually eliminated the risk of local recurrence (1.3% vs 6.1%; p=0.0005) (Quirke et al 2006).

2.10 Preoperative (Neoadjuvant) Chemotherapy in Resectable Rectal Cancer

Many randomised controlled trials have compared the addition of radiotherapy (preoperative or postoperative) to surgery with surgery alone in rectal cancer, reporting varying results. A meta-analysis examining the addition of radiotherapy to standard surgery identified 22 randomised controlled trials (14 giving radiotherapy preoperatively and 8 postoperatively), with a total of 8507 patients included (Colorectal Cancer Collaborative Group 2000). This showed a reduction in isolated local recurrence for both preoperative (from 22.5% to 12.5%; p<0.00001) and postoperative radiotherapy (25.8% to 16.7% p=0.00001). The benefit of adding radiotherapy to surgery was marginal for overall survival (62% vs 63% deaths; p=0.06).

The EORTC 22921 trial randomised 1011 patients with resectable (clinically staged T3-4) mid and lower rectal cancers to receive preoperative 5FU-based CRT or conventional radiotherapy alone with or without 4 further cycles of adjuvant 5FU chemotherapy postoperatively in a 2x2 trial design (Bosset et al 2005). TME was not a protocol requirement. The results show a significant reduction in local recurrence (p=0.0016) for patients who received chemotherapy (either synchronously or as an adjuvant) in addition

to preoperative radiotherapy. Local recurrence at 5 years in patients not receiving chemotherapy was 17.1%. Patients receiving adjuvant chemotherapy subsequent to preoperative radiotherapy had a similar rate of local recurrence to those receiving CRT with no subsequent adjuvant chemotherapy (8.7% vs 9.6%).

The FFCD 9203 trial randomised 733 patients with resectable palpable (clinically staged T3-4) rectal cancers to preoperative CRT or conventional radiotherapy alone. TME was not a protocol requirement. All patients were to receive 4 cycles of 5FU chemotherapy postoperatively (Gerard et al 2005 Ib). The results are similar to the corresponding arms of the EORTC trial (local recurrence of 8% vs 16.5% at 5-years).

The German GAO/ARO/AIO-94 trial randomised 421 patients with resectable T3-4 rectal cancers to CRT given either preoperatively or postoperatively. All patients were to have TME surgery. Patients receiving preoperative treatment had fewer local recurrences (6% vs 13%; p=0.006) and a lower risk of late toxicity (12% vs 24%; p=0.01) (Sauer et al 2004 Ib). The Polish trial randomised 312 patients with resectable palpable T3-4 rectal cancers to SCPRT or CRT followed by TME surgery. Unlike the other trials, the primary endpoint of this trial was not local recurrence but sphincter preservation rate. Initial results showed that the use of CRT did not appear to improve sphincter sparing (58% vs 61%; p=0.57) despite the fact that the tumours were on average almost 2 cm smaller (p<0.001) as a result of CRT (Bujko et al 2004 Ib).

In summary, these trials show that there are two strategies that have been proven to produce local recurrence rates in the region of 5-10% in resectable rectal cancer. These are short course preoperative radiotherapy followed by TME surgery (Dutch TME and CR07); or preoperative long course chemoradiotherapy followed by surgery (EORTC 22921; FFCD 9203; GAO/ARO/AIO-94). Inferior results (local recurrence rates in excess of 10%) are achieved by surgery alone, even though TME is performed (Dutch TME, CR07) or long course preoperative radiotherapy without either concurrent or postoperative chemotherapy (EORTC 22921) or post-operative chemoradiotherapy (GAO/ARO/AIO-94). The best results of all arise from the combination of very high quality TME surgery preceded by short course preoperative radiotherapy (CR07 subset analysis) (Sebag Montefiore et al, 2006 Ib).

The least intrusive of these strategies is the use of short course pre-operative radiotherapy followed by TME surgery. This may only be considered in patients who do not require a downstaging effect to allow tumour resection to occur. It remains to be proven whether the long-term complications of this approach outweigh the benefits in terms of the reduction in local recurrence and marginal effect on disease–free and overall survival.

Since the design of the trials described above, the increasing use of MRI for locoregional staging has significantly improved the ability of the Colorectal Multidisciplinary Team (MDT) to predict the T and N stage of newly diagnosed rectal cancers with greater accuracy. More importantly, most patients at risk of an involved CRM can be identified by measuring the distance of the tumour to the nearest mesorectal margin (Beets-Tan 2001; Brown et al 2003). A decision can then be made by the MDT whether to proceed to surgery, to offer short course radiation or to recommend long course radiation where

downstaging/downsizing is required. For low lying rectal tumours arising below the origin of the levator ani, the risk of an involved CRM is increased (Nagtegaal et al 2005 III; Marr et al 2005 III), and therefore long course chemoradiotherapy tends to be selected for lower stage tumours.

The evidence to support the use of preoperative combined chemoradiation in resectable rectal cancer remains controversial. In the German GAO/ARO/AIO-94 trial, preoperative CRT did not appear to improve the curative resection rate when compared with those who had immediate surgery (91% vs 90%; p=0.69) (Sauer et al 2004 IIb). However, the Polish trial showed that patients receiving CRT had a lower risk of an involved CRM when compared with SCPRT (4% vs 13%; p=0.017) (Bujko et al 2004 IIb). Whether or not this translates to improved locoregional control remains to be seen.

Using an appropriate 3 or 4 field radiotherapy delivery technique, postoperative mortality is not increased with the use of SCPRT or preoperative CRT (Kapiteijn et al 2001; Sebag-Montefiore et al 2006; Gerard et al 2005). For SCPRT, surgery should be performed within 7 days of completion of radiotherapy (Marijnen et al 2001; Hartley et al 2002). SCPRT is associated with delayed perineal wound healing and subsequently, a higher risk of impotence in men (Marijnen et al 2002). CRT is associated with more diarrhoea when compared with RT alone (Gerard et al 2005). Data from the Dutch TME study suggests that despite optimisation of radiotherapy technique for SCPRT, long-term effects on bowel functioning will still be seen. Of 597 patients from this study analysed for late effects, there was a significant higher rate of incontinence compared with patients undergoing surgery alone (62% vs 38%, p=0.001) (Peeters et al 2005 IIb). Data on toxicity and late bowel function following CRT from the randomised trials are awaited.

2.11 Preoperative Radiotherapy and Chemotherapy in Anticipated Unresectable Rectal Cancer

The MRC Second Rectal Cancer Trial randomised 279 patients with clinically fixed or tethered cancers to long course radiotherapy (40 Gy in 20 fractions over 4 weeks) followed by surgery 4 weeks later or surgery alone. Radiotherapy made no difference to the proportion of curative resections (47% vs 40%; p=0.21) performed but reduced the risk of subsequent local recurrence (hazard ratio 0.68; p=0.04; 95% CI 0.47-0.98) (MRC 1996).

The use of preoperative synchronous CRT has been extensively studied in both resectable and unresectable rectal cancers, but rarely in the context of a randomised controlled trial. In locally advanced disease classified as fixed on palpation or involving or threatening the CRM on MRI scanning, non randomised studies have reported the outcomes of patients treated with preoperative CRT followed by radical surgery. In a collated series of 677 UK patients treated with 5FU plus preoperative long course radiotherapy, complete resection with clear CRM was achieved in 57% and pathological complete responses in 13% (Sebag-Montefiore et al 2005). Several phase II trials in the same patient group incorporating irinotecan or oxaliplatin with 5FU-based CRT have reported CRM clear resections in 70-80% and pathological complete responses in 15-20%. A large randomised trial to evaluate this group of patients is in development.

2.12 Preparation of the Patient For Surgery

Appropriate patient selection and preparation for surgery is paramount to achieve best results. In so far as possible, the planned surgery should be discussed in detail with the patient and the patient should be appropriately prepared for all anticipated interventions, including stoma, even if such interventions are not inevitable.

2.12.1 Informed consent

Valid consent to treatment for colorectal cancer is essential and reflects patients' fundamental legal and ethical right to determine what happens to their own body. Valid consent requires that the patient must be competent to take decisions about treatment options, must have received sufficient information in an understandable form to make this decision, and must not be acting under duress. Informed consent is therefore a process of discussing options and coming to a joint decision with the patient by providing information about:

- Benefits and risks of the proposed treatment
- What the treatment will involve
- What the implications of not having the treatment are
- What alternatives may be available
- What the practical effect on their life of having, or not having, the treatment will be

The information will be gathered from a number of sources including the responsible Consultant, Specialist Colorectal Nurse, Stoma Therapist, Patient Support Groups and other information sources such as the internet.

This process would allow a patient time to reflect on the options and agree treatment with the responsible clinician. The health professionals carrying out a procedure are ultimately responsible for ensuring that the patient is genuinely consenting to what is being done as it is they who would be held responsible in law if this were challenged later. In most circumstances, the surgeon who is undertaking an operative procedure will signal completion of the consent process by completing a written consent form with the patient. Individual hospital policy in relation to the consent process should be followed. The risks attached to operative treatment should be discussed and documented, in particular, the risk of bleeding, infection, DVT, PE, anastomotic leak, the risk of an unplanned stoma and, in pelvic surgery, urinary and sexual dysfunction. Functional outcome should form part of the general discussion about the outcomes of treatment. It may be appropriate to discuss mortality risk and, increasingly, risk models are available to offer validated predictions to patients requiring this level of information.

Adult patients are always assumed to be competent to give consent unless demonstrated otherwise. Competent adult patients are entitled to refuse treatment. Practitioners should be aware that no one can give consent on behalf of an incompetent adult, who should be treated in their "best interest". "Best

interests" go wider than "best medical interests", to include factors such as the wishes and beliefs of the patient when competent, their current wishes, their general well being and their spiritual and religious welfare. People close to the patient may be able to give information on some of these factors. Where the patient has never been competent, relatives, carers and friends may be best placed to advise on the patient's needs and preferences. Clinicians are wise to document carefully the reasons for their decision in delivering a particular treatment when acting on behalf of a patient without written consent.

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

2.12.2 Preparation for stoma formation

If a patient may require a stoma, the nature and consequences of this should be carefully explained. The patient should be seen by a stoma nurse prior to surgery and the referral should be made at the earliest possible opportunity to allow adequate time for preparation and education. This is particularly important where patients may participate in an enhanced recovery programme with early discharge from hospital post-operatively.

It is also important that the site of the stoma be marked prior to surgery to ensure optimum fitting of the appliance. **Rectal cancer centres should have a stoma nurse specialist available for preoperative consultation and marking of the stoma site for all elective patients undergoing rectal cancer surgery.** 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.

2.12.3 Cross-matching of Blood

Evidence relating to a possible adverse effect of blood transfusion on oncologic outcome is equivocal and while transfusion is generally best avoided, it should not be withheld if there is a valid clinical indication to give it. Patients should be consented that blood product transfusion may be necessary during their operation and those who indicate a refusal to receive blood transfusion should be managed in accordance with local hospital policy. A type and screen should be performed on every patient undergoing rectal cancer surgery and local protocols in relation to cross-matching should be followed, with cross-matching essential if a more extensive operation is planned.

2.12.4 Bowel preparation

While traditionally bowel preparation has been used prior to rectal cancer surgery, some conflicting evidence exists. The Cochrane Review states that prophylactic mechanical bowel preparation before colorectal surgery has not been proven valuable for patients and there is evidence to suggest that mechanical bowel preparation using polyethylene glycol (PEG) should not be used before elective colorectal surgery. A randomised trial of sodium picosulphate (Picolax) versus no preparation showed that bowel preparation did not influence outcome after colorectal surgery. The rationale for avoiding bowel preparation prior to low anterior resection is less compelling than for colonic resection but many

laparoscopic surgeons omit bowel preparation. In the absence of robust evidence, local practice should be followed pending the result of clinical trials.

2.12.5 Thromboembolism prophylaxis

Patients undergoing surgery for rectal cancer are at increased risk of deep vein thrombosis (DVT) and pulmonary embolism (PE). 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 the rates of DVT, PE and death from PE can all be significantly reduced in general surgical patients. Low molecular weight heparin (LMWH) has attracted recent attention, and although it has been shown to be of similar efficacy to standard heparin, bleeding related complications are less common. Other measures which can be taken are the use of graduated compression stockings and the use of intermittent pneumatic compression devices, with one trial indicating that intermittent compression is at least equivalent to heparin in reducing the incidence of DVT. Graduated stockings alone are less effective than other measures. **Patients undergoing pelvic surgery for malignancy may be considered "high risk" for thromboembolic disease**, particularly after pre-operative adjuvant therapy. In these "high risk" cases the use of self administered LMWH for 2-3 weeks following surgery is recommended by the Cochrane review.

2.12.6 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. All patients undergoing surgery for colorectal cancer should have antibiotic prophylaxis. The antibiotic regime of choice should be determined in accordance with local microbiology advice and generally a single dose immediately before surgery should be favoured. Administration of antibiotic prophylaxis should be confirmed as part of the preoperative ("Safe Surgery") checklist. **With modern antibiotic prophylaxis, the rates of wound infection (presence of wound discharge with positive microbiology) following elective rectal cancer surgery should be less than 10%.**

2.12.7 Enhanced Recovery Programmes

With the development of Enhanced Recovery Programmes (ERP) optimising peri-operative care, there is a growing body of evidence which shows that hospital stays can be reduced without an increase in morbidity, deterioration in quality of life or increased cost. **Designated rectal cancer centres should establish locally relevant Enhanced Recovery Programmes.** The Association of Surgeons of Great Britain and Ireland document entitled *Guidelines for Implementation of Enhanced Recovery Protocols* (December 2009) represents a useful starting point.

2.13 Choice of Operative Technique

In rectal cancer resection technique is of great importance. Although most local recurrences after resection of colonic cancer occur alongside disseminated disease, local recurrences after rectal excision

are often isolated, and the reported rate of recurrence after curative rectal resection varies from 2.6% to 32%. Individual surgeons vary greatly in this respect, with two studies showing a variation of 0 to 21% in recurrence rate among the participating surgeons. The reasons for this variation are not entirely clear, although there is good evidence that surgical technique is a critical factor. **It is essential that surgeons treating rectal cancer are trained and experienced in all relevant operative techniques, that they perform enough operations annually to maintain their expertise, that they work in a team with other colorectal surgeons and that they participate in audit and CME activities.**

Complete excision of the mesorectum is associated with a low rate of local recurrence, and a pathological 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. 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. **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 (APR) in favour of anterior resection might account for high local recurrence rates, but several series have shown no difference between the operations. Recurrence rates are higher after APR than anterior resection, and whether this is due to involved circumferential margins or technical problems is not clear. Randomised controlled studies comparing APR 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.

A study of surgical technique by Marr et al describes the perineal approach to the abdomino-perineal excision with the patient in the prone position. The anus and levator muscles are excised allowing a cylinder of tissue to be removed, the so-called “cylindrical APR”. This results in the surgical resection margin being farther away from the muscularis propria and sphincters and a lower rate of CRM involvement. The resulting perineal deficit is covered by surgical flaps. In any case careful attention to a sufficiently wide circumferential margin at APR is necessary to ensure a curative resection. The reporting pathologist should carefully report on the involvement of the circumferential margin by tumour.

Perforation of the tumour during resection is also an important factor, as it is associated with local recurrence. If it occurs during surgery, it should be recorded in the operation note. This phenomenon appears to be independent of tumour stage or fixity. The role of pre-operative radiotherapy in downstaging tumours and reducing local recurrence has already been considered.

In summary, it is recommended that total mesorectal excision should be performed for tumours in the lower two-thirds of the rectum, either as part of a low anterior resection or an APR. 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.

2.13.1 Rates of curative resection

Curative resection can be defined as removal of all macroscopic disease at the time of operation, backed up by histological evidence that the resection margins of the specimen submitted to the pathologist are clear of tumour. **The colorectal surgeon should indicate on the operation note whether the operation is curative or whether microscopic (R1) or macroscopic (R2) disease remains.** If residual tumour is thought to remain, it should be biopsied where it is safe to do so.

A worryingly large proportion of patients, almost 30%, have incurable disease at presentation. This includes patients who do not have an operation (advanced cancer, co-morbid disease or patient choice), those who have an operative procedure that does not include cancer resection and those who have metastatic disease at the time of surgery. Introduction of a national colorectal cancer screening programme should reduce the stage of disease at presentation and may in time be anticipated to reduce the incidence of rectal cancer.

Curative resection also depends on good surgical technique, especially for rectal cancers. As this is a subjective intra-operative assessment, surgeons and centres vary as to the proportion of their operations which are classified as curative. Pathology plays a key role in quality assurance of rectal cancer surgery and for this reason the provision of high quality pathology services in every rectal cancer centre is mandatory. The Royal College of Pathologists Dataset for colorectal cancer provides detailed guidelines for pathologists and it is reproduced in Appendix 8. **The term curative resection should be based on surgical and histological confirmation of complete excision. Every rectal cancer histopathology report should contain the agreed rectal cancer minimum dataset.** 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.

2.13.2 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 with leak rates of 6-18% reported. **The ACPGBI recommends that surgeons should audit their leak rate which should be less than 8%.** (Appendix 4 Key Performance Indicators)

It is not possible to be dogmatic as regards method of anastomosis, although rectal cancer surgeons should be competent in all relevant techniques of rectal anastomosis including low stapled rectal anastomosis, handsewn coloanal anastomosis and colonic pouch construction. A Cochrane review has not shown any advantage of stapled over hand-sewn anastomosis, but a Scandinavian study did report a significant difference in leak rates between two types of stapling device. 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, the ability to obtain distal clearance of 1cm or more should therefore allow an anterior resection which is oncologically sound so long as it is combined with total mesorectal excision as described above.

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. Anastomotic leakage is associated with poorer survival (up to a five-fold increase in 30-day mortality) and a significant increase in the local recurrence rate. This desire for more distal anastomoses is based on the perception that quality of life is better with a low anastomosis than with a permanent colostomy. This is not, however, supported by a review of 11 trials including 1412 patients, which identified no differences in quality of life differences between the two treatment modalities (Pachler and Wille-Jorgensen 2006).

Cochrane reviews have shown no difference in leak rates in patients where bowel preparation has been omitted and whose anastomoses have not been drained. **There is evidence that a defunctioning stoma can ameliorate the consequences of leakage, decreasing the risk of death and need for a permanent stoma**. A number of 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.

Other problems associated with the low anastomosis are functional; many patients have urgency and increased frequency of bowel action 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, provided pouch limbs are no more than 5-6cm long, and several studies now attest to the efficacy of this procedure although alternatives are described including coloplasty and side to end anastomosis.

Finally, as large numbers of viable tumour cells can be demonstrated in the lumen of the colon at the time of operation, the use of a cytocidal washout prior to anastomosis is generally accepted as a sensible precaution to reduce the risk of anastomotic recurrence.

2.13.3 **Rates of permanent stoma formation**

Reported permanent stoma formation rates for rectal cancer vary from 9-37%. There seems to have been a general reduction in the proportion of rectal cancer treated by APR 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 stated above, distal intramural spread rarely extends more than 1cm beyond the palpable edge of the tumour, and it is possible that failure to recognize this finding results in an inappropriate number of APRs being performed by non-specialist surgeons.

In low rectal cancers, where the feasibility of anterior resection is uncertain, a second opinion from an experienced rectal surgeon should be obtained. There may also be cases where it is appropriate that two consultant colorectal surgeons would operate together. This process will be facilitated by the development of rectal cancer specialist centres. It is difficult to determine what the ideal ratio of anterior resection to APR should be, but **it is recommended that the overall proportion of resectable rectal cancers treated by APR should be less than 30%**. If distal clearance of 1cm can be achieved, a low rectal

cancer may be suitable for anterior resection but the patient's likely functional outcome must also be considered.

2.13.4 **Local excision**

Occasionally, small pT1 rectal cancers can be safely treated by a local excision, and some polyps excised by snare diathermy will contain invasive carcinoma. Careful studies have shown that cancers fulfilling histological criteria defined elsewhere can be regarded as curable by local excision whereas sm3 and pT2 tumours are associated with a higher risk of lymph node involvement and of local recurrence without further treatment. Follow up after local excision using MRI and/or endorectal ultrasound is recommended.

Local excision of rectal adenomas using transanal endoscopic microsurgery may also be appropriate in selected cases. Published data suggest that this is at least as good as traditional transanal resection and may offer advantages for patients with polyps in the middle third of the rectum. Local excision in rectal cancer is appropriate only for pT1 cancers which are graded well or moderately well differentiated and less than 3cm in diameter. Subsequent histopathological examination of cancers treated by local excision may, however, identify a proportion requiring more radical surgery.

2.13.5 **Laparoscopic surgery**

Laparoscopic surgery offers a range of potential benefits for patients, and is being used increasingly for colorectal cancer. As with all new surgical techniques, extensive practice is required to develop the necessary skills. Several randomised studies have compared short and long term results of laparoscopic colorectal cancer surgery with open surgery. There is now robust evidence that laparoscopic surgery shows no difference in rates of overall survival, disease-free survival and tumour recurrence when compared with open resection for colon cancer. Completeness of resection margins is also similar, and although circumferential margin positivity in the MRC-CLASSIC study was greater in laparoscopic than in open anterior resection (12% vs 6% respectively), this was not statistically significant. However, there may be a tendency towards increased sexual dysfunction after laparoscopic rectal excisions. Early reports of laparoscopic colorectal cancer surgery led to concern about port-site metastases but the incidence is less than 1%, similar to open surgery. Laparoscopic colorectal resection takes longer to perform than open procedures, but operative duration falls with increasing experience. Blood loss and blood transfusion requirements are less in patients undergoing laparoscopic colorectal surgery. Short term complications, particularly wound infections, are reduced in laparoscopic surgery, whilst anastomotic leakage and mortality rates are similar to those for open procedures. There is also a tendency for less long term morbidities, especially in the rates of incisional herniation and small bowel obstruction. Hospital stay is shorter for laparoscopic surgery, results in less postoperative pain and in less need for analgesia compared with open surgery, and has short term improvements in quality of life. Some of these improvements may be achieved through addition of an enhanced recovery programme to standard open surgery.

All laparoscopic colorectal operations for cancer should be performed by properly trained surgeons in colorectal surgery. These surgeons should have undergone preceptorship laparoscopic training, particularly in rectal procedures, and should participate in audit, including the Association of Coloproctology of Great Britain and Ireland colorectal cancer database.

2.13.6 Record keeping

Operation notes should follow standard hospital protocols and should contain the agreed minimum dataset (Appendix 9), in particular, including information on anastomotic technique, the extent of resection and the presence or absence of metastases or suspected residual disease.

2.14 Management of patients presenting as emergencies

Patients with rectal cancer present as emergencies in 10% of cases, as reported in the National Bowel Cancer Audit Project 2007 of the ACPGBI, although there is likely to be some overlap with certain obstructing sigmoid colon tumours and benign strictures also being referred to the designated centres due to the reduction in appropriately trained surgeons in non-designated hospitals likely to result from the centralisation process. Centralisation of rectal cancer surgery into designated Rectal Cancer Specialist Centres requires consideration of provision of emergency surgical service to accommodate such patients. The NBOCAP audit reported on 41432 patients with colorectal cancer treated from 2006-2008, of whom 18% were recorded as having an urgent (within 24 hours, 9.7%) or emergency (within 2 hours, 8.5%) operation. Similar figures (9% emergency, 9.4% urgent) were reported in the 2009 report.

Emergency surgery is associated with higher operative mortality. Even after apparently curative resection for colorectal cancer, there is an excess of both cancer-related and intercurrent deaths in patients who present as an emergency. The NBOCAP report shows a mortality of 12% in patients undergoing emergency surgery for all forms of colorectal cancer compared to 4% in scheduled resections. It should be noted that this includes patients with both colon and rectal cancer and the anticipated morbidity and mortality can be expected to be higher in patients with rectal cancer than those with colon cancer. The Swedish study confirmed that there was a stage-specific difference in survival, with poorer survival of patients at all stages after emergency surgery compared with elective. Emergency surgery should be carried out during daytime hours as far as possible, by surgeons and anaesthetists who are members of a colorectal cancer MDT. **The ACPGBI recommends an overall mortality of less than 25% of all operations performed for an emergency or urgent presentation with colorectal cancer.** It should be noted that this includes all patients with colorectal cancer emergency surgery and includes both colon and rectal cancer.

The commonest emergency presentation of colorectal cancer is obstruction with bleeding and perforation much less common. 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. Antibiotic and DVT prophylaxis should be administered. Centres undertaking this type of surgery should have an intensive care unit or a high dependency unit, and these should be used for postoperative and preoperative care when appropriate. As noted earlier in this document, when centralisation of rectal cancer surgical services occurs, the levels of expertise in managing complex gastro-intestinal (GI) emergencies will diminish in all hospitals nationally except the eight designated NCCP centres with the likely outcome that GI emergency surgical services would no longer be available in every hospital. Provision for emergency access to a rectal cancer centre for such patients must be made.

2.14.1 **Diagnosis and Preoperative Management of Malignant Large Bowel Obstruction**

(Refer to ACPGBI guidance document published by Finan PJ et al, The Management of Malignant Large Bowel Obstruction: ACPGBI Position Colorectal Disease 2007, 9 (Suppl. 4), 1–17)

Malignant large bowel obstruction occurs in up to 20% of patients with colorectal cancer and it is an important component of colorectal cancer-related morbidity and mortality. Almost 25% of all post-operative deaths following surgery for colorectal cancer occur in those who present initially with obstruction and in survivors, morbidity may be considerable.

Patients with obstruction are often elderly with associated co-morbidities and the therapeutic options are varied. While clinical assessment and plain abdominal xrays may make the diagnosis, additional information confirming the presence and site of obstruction should be obtained from single contrast enema studies. The principle role of this procedure is to exclude patients with intestinal pseudo-obstruction and to confirm the site of mechanical obstruction. The main limitations of a contrast enema are that patients have to be relatively mobile and capable of retaining contrast. No information about the viability of the proximal distended bowel or the extent of the primary lesion or of distant metastases can be gleaned.

CT scanning may offer more comprehensive information and studies suggest it may be superior to contrast enemas in expert hands. It can distinguish mechanical obstruction from pseudo-obstruction by identification of dilated colon proximal to a transition point and collapsed colon distal to this site. It can also differentiate malignant and benign causes of large bowel obstruction (eg colonic volvulus) and allow detection of metastatic disease at an early stage. Future developments are likely to improve its ability to diagnose large bowel obstruction. **Specialist rectal cancer centres should have the capacity to perform and interpret contrast enemas and CT scans on a 24 hour basis.**

Although colonoscopy may identify an obstructing lesion, it is often not possible to traverse the lesion and while biopsies may be obtained, the role of colonoscopy in the initial diagnosis of malignant large bowel obstruction is limited. Treatment for acute large bowel obstruction should generally not be deferred pending the results of biopsies. The main role of colonoscopy in obstructed colorectal cancer is in therapeutic interventions like the insertion of a trans-anal drainage tube or a colonic stent. The introduction of self-expanding metallic stents (SEMS) can convert an emergency or urgent situation into an elective one, allowing time for assessment and management of co-morbidity that may improve

patient outcome. In the absence of signs of perforation, peritonitis, or closed loop obstruction, a stent should be considered as a definitive therapy or as a bridge to surgery depending on individual patient factors. Technical and clinical success rates of around 90% are reported and, in expert hands, the procedure seems safe with a perforation rate of 3–4%. The main complications are stent migration (10–11%) and re-obstruction (7–10%). No oncologic disadvantage is currently demonstrable, but a randomized trial is underway. Stent placement is more likely to fail if it involves a colonic flexure and it is generally considered unsuitable for low rectal lesions where stents have a tendency to dislodge and also cause distressing local symptoms. Patients with advanced disease or who prove medically unfit for resection may benefit from palliation with a stent, which may also spare the patient from a stoma. Studies of the role of laser photocoagulation and cryosurgery in the palliative setting are ongoing.

2.14.2 **Peri-operative management of malignant large bowel obstructions**

Patients who present acutely with colorectal cancer have a three-to fourfold increase in mortality when compared to an elective situation. The preoperative ASA grade impacts significantly on subsequent 30-day mortality and should be recorded for every patient. Time spent on preoperative resuscitation of patients presenting acutely is dictated by their clinical condition, particularly by concerns regarding the viability of the proximally distended colon. Decompression either by means of a proximal stoma or with stenting may increase the time available for appropriate optimization of the patient. There is good evidence that optimization strategies, known as enhanced recovery protocols, are associated with significant benefits to patients undergoing elective colorectal surgery. Implementation of the principles of optimization should, however, be considered in the management of the obstructed patient. Additional measures, known to be of proven benefit in the acutely ill (although not specifically those with colonic obstruction), include glycaemic control maintaining blood sugars no greater than 6 mmol /l with exogenous insulin and precise fluid resuscitation using oesophageal Doppler measurements pre-and per-operatively to optimize cardiac output and avoid splanchnic hypoperfusion. In any case, **expert intraoperative anaesthetic care is a priority.** Preservation of intestinal barrier function, already compromised in emergency patients with obstruction, should be facilitated by endeavours to reduce operating times, extent of bowel handling and overuse of opiates, all of which impinge on barrier function. In some circumstances, avoidance of an anastomosis may ensure an earlier return of adequate gut function which is an independent factor associated with enhanced recovery.

2.14.3 **Surgical management of malignant large bowel obstructions**

Despite efforts to convert an emergency or urgent clinical situation into a more elective one, sometimes emergency surgical management of the acutely obstructed colon remains necessary. Surgery remains a major component of the management of this condition and poses a challenge to the operating surgeon. Distended unprepared bowel, dehydration, advanced disease and frequent need for surgery out of hours are all factors which predispose to complications.

The ‘ideal’ operation is the one that would be chosen in the elective setting, namely resection and primary anastomosis. Whilst this is common practice for right-sided tumours, it has traditionally been perceived as too risky where the obstruction is more distal. It is noteworthy that the ACPGBI audit of

large bowel obstruction noted that the increased mortality observed in emergency or urgent cases applied to right-sided lesions as well as left. Primary resection and anastomosis, as opposed to a staged procedure, is now considered by many to be the surgical treatment of choice for all cases wherever the tumour is situated. The single procedure has similar mortality to that of staged procedures, with a shorter hospital stay and lower morbidity under favourable circumstances. Fewer patients with a single procedure retain a permanent stoma. Studies comparing the two frequently suffer from selection bias as surgeons will naturally choose to perform a primary resection and anastomosis on the fitter patients and will reserve staged procedures for those who are unsuitable for anastomosis. Consequently the results of staged procedures are bound to appear worse. Bias is reduced if all patients are treated in the same manner. A Cochrane report investigating primary or staged resection for malignant large bowel obstruction concluded that there was no evidence to recommend one procedure over the other and felt it unlikely that a large enough trial could be performed in an appropriately timely manner. Primary resection and anastomosis is the preferred option for uncomplicated malignant left-sided large bowel obstruction. Planned two-or three-stage procedures remain acceptable management strategies in appropriate cases and techniques such as tube caecostomy or primary diverting stomas may continue to be useful in selected patients.

Subtotal colectomy and segmental resection are equally safe where there is a choice of procedure but certain factors favour one over the other. The presence of caecal ischaemia, perforation or a serosal tear leads to subtotal colectomy being favoured as does the identification of synchronous lesions. Serosal tears can be repaired and segmental resection performed, but this may expose the patient to unnecessary risk. Where the anastomosis will be in the rectum, as in all rectal cancers, or where continence is diminished, a segmental colectomy is favoured to optimise functional outcome. The SCOTIA trial indicted that subtotal colectomy results in more frequent bowel action and need for constipating agents when compared with a limited resection. While bowel function improved over time, it remained significantly poorer in those undergoing subtotal colectomy with the latter group also significantly more likely to have a permanent stoma at followup. Interpretation of studies in this area is difficult and subject to patient selection bias.

There is increasing impetus to avoid bowel preparation in elective surgery with a realization that it may do more harm than good and consequently the need for lavage in the emergency situation is also being questioned. In segmental colectomy, the morbidity and mortality is not significantly different whether on table lavage is performed or not, but lavage adds to the operating time. On table lavage and manual decompression would appear to be equally effective in patients with left-sided colonic obstruction although most authors favour the former. If segmental colectomy is performed the use of on table lavage is at the discretion of the surgeon, but is not essential.

There are no reports suggesting that primary anastomosis should routinely be covered by a functioning loop stoma nor is any guidance given about circumstances that would merit diversion. It appears safe to avoid a stoma altogether although surgeons must use their judgement. Metastatic disease to the liver alone is not in itself a contraindication to resection and primary anastomosis.

Not all patients presenting with malignant left-sided colonic obstruction are suitable for primary resection and anastomosis. About 10–15% may have irresectable disease at presentation and a further 30% may have other adverse factors which dictate the choice of surgery. Patients requiring emergency surgery are more likely to be dehydrated, septic and suffer from cardiovascular instability. It is surgical common sense not to perform an anastomosis in adverse situations. Faecal peritonitis, hypotension, a requirement for inotropic support and an anticipated need for post-operative intensive care are all good reasons to avoid primary anastomosis. Most experienced colorectal surgeons would still recommend resection of the primary tumour if possible. In this context, a Hartmann's procedure is the most appropriate option. Patients in whom an emergency Hartmann's procedure is performed have a high chance of having no further procedure and will therefore be left with a permanent end stoma . In patients with pre-existing impaired continence it is sensible to avoid a low anastomosis or a near total colectomy with ileorectal anastomosis. If segmental colectomy is an option then that would be preferable to the alternative of a Hartmann's procedure where the patient will tolerate a somewhat longer operation. Surgeons should balance the risks of more complex and time consuming primary surgery with a better long term functional outcome versus the benefits of a Hartman's operation in a critically ill patient who may benefit from a shorter operation.

Perioperative mortality is increased in older patients with obstruction compared with younger patients and those undergoing elective surgery with ASA grade, proximal colonic damage and preoperative renal failure significantly prognostic. More advanced disease carries a higher mortality but several authors have stated that metastases confined to the liver should not be considered to be a contraindication to primary anastomosis. In patients with diffuse malignancy, especially within the peritoneal cavity, a stoma is probably more appropriate. In the presence of faecal peritonitis, shock, severe sepsis, an ASA IV patient or widespread peritoneal malignancy, a Hartman's procedure should be performed because of the increased risks of primary anastomosis.

Emergency surgery for acute obstruction should be performed by an experienced surgeon who is able to perform all the available procedures for large bowel obstruction. **Individual units should submit their results of surgery for malignant large bowel obstruction for audit and such mortality data should be risk adjusted**. Few would argue that surgery for acute large bowel obstruction should ideally be treated by specialist colorectal teams just as in the elective setting. Frequently, however, this is not possible because of surgical urgency or lack of availability of a colorectal surgeon or of a bed in a specialist centre.

The hope for the future is that prediction of risk may be useful in guiding the surgeon in decision-making regarding the choice of procedure to be performed. As yet there are no prospective studies published on this topic. The choice of surgery for acute malignant left-sided large bowel obstruction can be guided by evidence from the literature. Although there are many reports on this topic, very few are prospective and only a few are randomized. The potential for selection bias is large and no particular strategy is appropriate in every circumstance. There is still a necessity for decision-making by an experienced surgeon in the operating theatre.

2.15 Post-operative Rectal Cancer MDT Meeting

Every postoperative rectal cancer patient should be discussed at the rectal cancer MDT meeting for review of the pathological findings and planning of future treatment strategies. As previously noted, pathology plays a critical role in quality control of rectal cancer surgery. **All components of the Minimum Pathologic Dataset (Appendix 8)should be available at the postoperative MDT meeting.**

2.16 Postoperative Radiotherapy

If the addition of radiotherapy to surgery is deemed necessary for rectal cancer, it should ideally be given pre-operatively. However, in cases with well established predictive factors of local recurrence (e.g. evidence of tumour at the circumferential resection margin, mesorectal lymph node involvement and extramural vascular invasion), post operative radiotherapy and chemotherapy should be considered for patients who did not receive pre-operative radiotherapy. A dose of 45Gy in 25 fractions over 5 weeks with a planned boost dose of 5.4-9Gy in 3-5 fractions is recommended.

Meta-analysis of the postoperative radiotherapy trials also shows an effect on local recurrence, but the size of benefit is smaller (18.6% vs 13.3%) than for preoperative radiotherapy (Colorectal Cancer Collaborative Group 2001) and no significant effect on either cancer specific survival or overall survival has been confirmed. Two randomised trials have specifically examined the question of the optimal timing of radiotherapy. The Uppsala trial randomised 471 patients to either SCPRT or postoperative radiotherapy (60 Gy in 30 fractions over 7-8 weeks). Preoperative radiotherapy resulted in patients at lower risk of local recurrence (13% vs 22%; p=0.02) and fewer long-term complications (Frykholm et al 1993). The German GAO/ARO/AIO-94 trial has convincingly shown that postoperative CRT is less effective and more toxic than preoperative radiotherapy. Therefore the routine use of postoperative radiotherapy with or without chemotherapy cannot be recommended. If a patient has a resection where the circumferential margin is involved (less than or equal to 1mm), and they have not received preoperative radiotherapy, then postoperative CRT may be an acceptable salvage approach and should be considered by the MDT.

2.17 Adjuvant Chemotherapy for colorectal cancer

Chemotherapy has an increasing role in the management of colorectal cancer and has been a major contributing factor to the significant improvements in prognosis over the last two decades. It should be given as part of a management plan agreed following discussion at a specialist colorectal Multi Disciplinary Team (MDT) Meeting. Systemic therapy is optimally administered under the direction of a recognised clinical or medical oncologist, within facilities conforming to national guidelines. **Entry into clinical trials evaluating new treatments and strategies for colorectal cancer should be actively encouraged.**

The choice of adjuvant treatment should be made jointly by the patient and the clinician responsible for treatment following discussion at a specialist colorectal Multi Disciplinary Team (MDT) Meeting. Decisions should be taken after a detailed discussion between these individuals taking into account the

patient's risk factors for relapse, their co-morbidities, performance status, any specific contraindications, and the side-effect profile of the agent(s). The method of administration and preferences of the individual are also important considerations. Informed consent should be obtained by the treating medical oncologist.

2.17.1 **Node positive disease**

Large meta-analyses of historical data from randomised trials have demonstrated that post-operative systemic single-agent chemotherapy improves survival for patients with Dukes' C tumours. The standard regimens were based on 5-flourouracil (5-FU) modulated by folinic acid (FA), and given for 6 months. Pooled data suggest that 5-FU/FA regimens can increase disease-free survival at 5 years from 42% to 58%, and overall survival by as much as 13%, from 51% to 64%, when compared with surgery alone (NICE 2004 Ia) Current national guidance makes no distinction between colon and rectal cancer, and recommends that all patients with node positive disease be offered chemotherapy, if they are deemed fit enough to tolerate its side effects. More recently, oral forms of 5-FU (uracil- tegafur and capecitabine) have been licensed for this indication, on the basis of the results of two large randomised trials comparing their efficacy and safety with bolus 5-FU/FA (Mayo Clinic regimen) in the postoperative adjuvant setting (Twelves et al 2005 Ib, Lembersky et al 2006 Ib). Both confirmed that the oral drugs were at least as effective as the standard intravenous treatment. For example in the X-ACT study, after a median follow-up of 3.8 years, 35% of patients in the capecitabine arm had experienced disease recurrence or died, compared with 39% in the 5-FU/FA arm. With regard to survival, 80% and 77% of patients were alive in the capecitabine and 5-FU/FA arms, respectively, with no apparent differences in quality of life (Twelves et al 2005 Ib). These agents are also associated with less toxicity and greater patient convenience.

There is also now overwhelming evidence of additional benefit from the use of combination therapy, specifically regimens based on oxaliplatin and 5-FU. Two phase III, randomised controlled trials that compared oxaliplatin containing regimens with standard treatment have been published (Wolmark et al 2005 Ib, Andre et al 2004 Ib). The first was the Multicenter International Study of Oxaliplatin/5-fluorouracil and leucovorin in the Adjuvant Treatment of Colon Cancer (MOSAIC) trial. This study included 2246 participants, 60% with stage III and the remainder with stage II colon cancer. The second was the National Surgical Adjuvant Breast and Bowel Project (NSABP C-07) trial, involving 2492 patients, 71% with stage III and the remainder with stage II colon cancer. In both trials the addition of oxaliplatin to 5-FU/FA, albeit administered via different regimens, led to a statistically significant reduction in rate of relapse when compared with 5-FU/FA monotherapy. Analysis of disease-free survival at 3 years showed a hazard ratio for recurrence of 0.77 (95% CI, 0.65 to 0.91) in the MOSAIC trial (median follow-up 37.9 months), and 0.79 (95% CI, 0.67 to 0.93) in C-07 (median follow-up 34 months). Additional analyses on MOSAIC showed a 24% reduction in the rate of relapse (improved disease-free survival) at a median follow-up of 4 years (hazard for recurrence 0.76; 95% CI, 0.65 to 0.90). Toxicity was acceptable with low rates of persistent severe (greater than grade1) neuropathy (<1%) and no excess of treatment associated fatality in the oxaliplatin containing arms.

The challenge is now to determine for the individual patient which of these alternative approved treatments is the more appropriate for use as adjuvant therapy in node positive colorectal cancer. The benefit in terms of improved likelihood of disease free survival from the use of oxaliplatin should be set against the side effects and acceptability of the regimen. In general, a higher risk, otherwise fit patient should be offered oxaliplatin based adjuvant therapy as their risk of death from cancer significantly outweighs their risk of death from other causes.

2.17.2 **Node negative disease**

The magnitude of benefit for adjuvant chemotherapy in Dukes' B tumours is smaller. Some studies of 5-FU based treatment have failed to demonstrate any benefit at all. Examples include the IMPACT B2 study, a pooled analysis of 1,116 patients with stage B2 colon cancer randomised to chemotherapy versus observation which showed no significant improvement in overall survival (OR 0.86, CI 0.72-1.07) (IMPACT 1999 Ib) In contrast, a grouped analysis of the National Surgical Adjuvant Bowel Project (NSABP) trials C-01 and 04, which included 1,565 Dukes' B patients, concluded that a 30% proportional reduction in mortality resulted from the use of chemotherapy consistent with a 5% absolute reduction in death at 5 years (Wolmark et al 1999 Ib) The more recently reported UK QUASAR 1 study has also shown a modest benefit with bolus 5-FU/FA of around a 4% improvement in overall survival, and confirmed that this was cost-effective, especially in the under 70 age group. This data together suggests a small (5% or less) absolute increase in survival for patients with Dukes' B cancers from adjuvant single agent chemotherapy. The MOSAIC trial (q.v.) included node negative patients, and a smaller but statistically significant incremental benefit to the addition of oxaliplatin was demonstrated, although a license has not been sought in this indication. A number of poor risk features can be identified in Dukes' B cancers: serosal involvement (T4), perforated or obstructed tumours, poorly differentiated or mucinous histology and perineural or extramural vascular invasion. A combination of these features may confer a worse prognosis in a node negative tumour than in an otherwise favourable lesion with one or two positive lymph nodes. Individual patients should be assessed for their specific risk on this basis by the MDT and counselled regarding the pros and cons of treatment.

2.18 **Chemotherapy for Advanced Disease**

2.18.1 **Locoregional recurrence**

This is most often observed following surgery for rectal cancer, but with modern staging techniques (i.e. MRI) and selective pre-operative treatment strategies it is anticipated that it will become a much less frequent event. Pre-operative chemoradiation prior to surgical resection of recurrent disease has increased resectability rates to 60% but remains unproven in Phase III trials (Rodel et al, 2000 IIb). Patients with locoregional recurrence in the absence of metastatic disease should be reviewed by the multi-disciplinary team for consideration of radical salvage combined modality treatment.

2.18.2 **Inoperable primary disease**

Inoperable primary disease is associated with a poor prognosis. Combined chemoradiation to downstage or downsize such tumours prior to attempted resection is the current standard approach. The potential for additional neo-adjuvant systemic therapy prior to chemo-radiation to improve resectability rates is currently the subject of investigation in a number of clinical trials. For patients unfit for such an approach, palliation is the objective of therapy. Palliative radiotherapy or systemic chemotherapy can offer useful symptom control, and the choice of regimen is generally the same as for metastatic disease. In fit patients with inoperable but non-metastatic rectal carcinoma primary chemo-radiation should be offered, prior to re-staging and potentially curative resection considered if appropriate. Palliation if inoperable primary disease with endoluminal stent insertion or faecal diversion may be required.

2.18.3 **Operable Metastatic disease**

It has been known for many years that patients with operable metastases in the liver or lung may benefit from resection, and with careful patient selection, hepatectomy for colorectal metastases is associated with a 5 year survival of around 33%. It is currently unclear whether patients with operable metastatic disease benefit from pre-operative chemotherapy, and if the temporal development of metastases (synchronous or metachronous) has any influence on the role of systemic therapy. There is also some evidence to support the use of the same approach for patients with resectable pulmonary metastases, but there is no evidence that resection of nodal metastatic disease is beneficial.

Non-randomised evidence exists to support the use of pre-operative combination chemotherapy prior to resection in patients with potentially operable liver metastases. Such patients should be discussed in the multidisciplinary team meeting in the presence of a hepatic surgeon. If appropriate following radiological and surgical review, pre-operative combination chemotherapy should be delivered for at least 8 weeks prior to re-imaging. Fit patients with resectable or potentially resectable liver or lung metastases should be reviewed in the MDT with a hepatobiliary (or thoracic) surgeon and colorectal oncologist, to evaluate operability and to decide on a combined plan of management to optimise the chance of achieving complete resection of all metastatic disease.

2.18.4 **Inoperable metastatic disease**

Selection of patients for chemotherapy requires the opinion of an oncologist experienced in colorectal cancer chemotherapy. A large number of factors including performance status, serum biochemistry and overall tumour burden influence the patient's ability to tolerate treatment. These can also independently predict progression and survival. Performance status is a particularly potent indicator. In a meta-analysis of patients treated in trials of 5-FU based chemotherapy, median survival times were 4, 10 and 14 months for patients with ECOG performance status scores of 2, 1 and 0 respectively (Thirion et al, 1999 Ia). Patients with unresectable metastatic disease should be discussed by the MDT and should be referred to the palliative care team. If appropriate, they should also be referred to an oncologist for consideration of palliative chemotherapy.

A number of meta-analyses of palliative chemotherapy have shown improved survival with chemotherapy compared with best supportive care. The evidence indicates that early single agent chemotherapy prior to clinical deterioration for advanced disease improves survival by 3 to 6 months and either improves or maintains quality of life (Simmonds 2000 Ia). In patients with stable or responding disease after 12 weeks therapy, a rest from treatment with close observation until disease progression was not shown to be detrimental to survival and contributed to improved quality of life in one UK study (Maughan et al, 2003 Ib). The oral 5FU prodrugs UFT and capecitabine have shown equivalent survival and increased ease of administration compared to bolus 5FU and low dose folinic acid, and are NICE approved as single agents for first line treatment.

More recently combination chemotherapy with intravenous 5-FU plus either irinotecan or oxaliplatin has been shown to offer survival benefits in both first and second line situations. Current NICE guidance supports the use of all three of the active drugs (a fluoropyrimidine, oxaliplatin and irinotecan) and as such has deemed them cost effective. As always, however, therapeutic decisions should be taken at the discretion of the treating oncologist, bearing in mind the fitness of the individual and other criteria as above. Improved results have been reported in studies in which all three of these agents are used in the majority of patients (Grothey 2005 III).

The most recent developments are with targeted monoclonal antibodies used in conjunction with chemotherapy bevacizumab (Avastin), an antibody to the vascular endothelial growth factor, has been shown to confer an additional benefit of 4.7 months in median survival compared to irinotecan and 5-FU alone in the first line setting (Hurwitz et al, 2004). Cetuximab (Erbitux), an epidermal growth factor receptor inhibitor, appears capable of overcoming drug resistance in second and third line situations (Cunningham et al, 2004 III).

2.19 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. This is especially the case when curative treatment is not possible. Patients with cancer 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 communication between health professionals and patients is essential for the delivery of high quality care. It is also central to empowering patients to be involved in decision making. All 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. Increasingly, palliative care is being seen as an integral part of care, often being delivered alongside cancer treatment. Careful control of symptoms is an important aspect of quality 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 an 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. Surgeons and oncologists who deal with colorectal cancer should make it a priority to build close links with palliative care specialists and units. All clinicians who deal with colorectal cancer should be trained in communication skills, in the control of pain and other cancer symptoms

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.

2.20 **Follow up**

The debate continues on the subject of patient follow up after curative treatment for colorectal cancer. Further evidence in the literature has failed to clarify the issue and a number of trials are ongoing. Possible benefits from long-term follow up are detection of potentially curable recurrent or metastatic disease, detection of asymptomatic recurrence when early chemotherapy may improve quality of life and prolong survival, detection of metachronous tumours, provision of psychological support by patient-doctor contact, facilitation of audit, clinical governance and continuing professional development, accurate determination of survival rates and detection of potentially curable recurrent disease

Four well conducted systematic reviews are supportive of clinical follow up, but the ability of following to detect potentially treatable recurrent disease is controversial.

Current studies do not provide a definitive answer to whether follow up delivers a survival advantage due to low statistical power. The fact that only a small proportion of patients with metastatic disease are potentially curable, and the lack of agreement as to what constitutes a “minimal” or “intensive” follow up regimen.

Many centres have now adopted a policy of CT scanning to look for liver metastases largely as a result of data from liver resection specialists showing that patients with resectable liver disease have a 30% 5 year survival, compared with a very small prospect of five year survival if left untreated. No study directly addresses the place of postoperative liver scanning and guidance for its use in asymptomatic patients is limited. However, there is little doubt that a small number of patients found to have metastatic liver disease may be cured by liver resection. A very large trial will be necessary to resolve this issue. Inclusion of an annual liver CT scan for patients in the intensive arm of the Australian randomised trial of intensive versus standard follow up resulted in 3 liver resections in 157 patients who underwent 674 liver scans. One patient was alive and disease free at 2 years. These data are consistent with other studies, which show that up to 40% of patients will develop liver metastases despite apparently curative surgery and, of these, 2 - 3 % are suitable for liver resection. The 5-year survival in this selected group is 30% and the role of routine postoperative liver scanning, for a large population, is therefore uncertain.

Detection of asymptomatic recurrence may be beneficial when early chemotherapy may improve quality of life and prolong survival. Two small randomised trials have shown that early systemic chemotherapy for asymptomatic metastatic colorectal cancer improves time to symptomatic deterioration, compared

with delaying chemotherapy until symptoms develop. Quality of life measurements in these studies also favour early chemotherapy for asymptomatic disease.

It must be stressed that many issues around the values of follow up scans remain unresolved: the optimal timing and frequency of this investigation has not been determined, the role of adjuvant chemotherapy and its timing in relation to hepatic surgery and more information on which to base the recommendation is urgently required. Current trials in the UK and Europe are in progress (FACS and GILDA). The current minimum followup recommendations of the Irish Association of Coloproctology are outlined in Appendix 10

2.20.1 **Detection of metachronous cancers**

Patients with colorectal cancer are at increased risk of developing adenomas and a second primary (metachronous) cancer in the remaining large bowel. Surveillance colonoscopy after the initial resection results in a substantial yield of such tumours, many of which were probably synchronous with the index cancer. On this basis patients who did not have complete colonic visualization/imaging preoperatively should undergo early (within 12 months of operation) colonoscopy. Once complete colonoscopy has been achieved and the patient found to be free of cancers and polyps ("clean colon"), further colonoscopy should be repeated at five yearly intervals. If adenomatous polyps are found follow up should be arranged in accordance with the guidelines from the British Society for Gastroenterology (Appendix 11). There is considerable debate and no evidence about when to stop offering endoscopic surveillance. It is suggested that colonoscopic surveillance should cease when patient and doctor have discussed and agreed that the likely benefits no longer outweigh the risks of further examinations (usually around age 75 years), or when the patient is clearly unfit for further intervention. It must be stressed that there is no evidence that colonoscopic follow-up has a significant impact on survival following surgery for colorectal cancer.

2.20.2 **Provision of psychological support**

The social and psychological morbidity associated with anorectal excision can be minimised by a combination of attention to surgical technique, the 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. 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. Patients with breast cancer prefer follow up and hospital visits do not increase stress and anxiety. However a more recent UK study of patients with breast cancer in remission found that general practice follow up was not associated with increase in time to diagnosis of recurrence, increase in anxiety or deterioration in health related quality of life. There are a limited number of studies in colorectal cancer. An evaluation of the effect of follow up examinations on health-related quality of life in patients undergoing either intensive or minimal follow up, concluded that the relatively small benefit did not justify intensive follow up after surgery for colorectal cancer. A Dutch study also failed to show an effect of the follow up visit on quality of life. However patients expressed a

strong preference for follow up and the majority would prefer regular appointments even if it did not lead to earlier detection of recurrence.

2.21 Audit

If guidelines are to be of value, surgeons must audit their results, and for this some form of follow-up is essential. Audit is the only means by which clinical outcomes can be measured and it underpins clinical governance. Accurate, relevant, reliable data in which clinicians have confidence, is an absolute prerequisite for audit and demands organised and disciplined methods of collection. The Association of Coloproctology of Great Britain and Ireland has produced a minimum data set which may help to overcome some, but not all, of the pitfalls in data collection for colorectal cancer audit (Stamatakis et al 2001 IV). Fundamental to the data set is a data dictionary, which precisely defines each field to ensure conformity of interpretation. The data set and data dictionary are freely available on the internet at www.canceruk.net. It is only by audit that surgeons can evaluate their results against professional standards. Information from audit provides the stimulus to investigate and perhaps modify personal practice. Adequate staff and information technology facilities must be available for this essential part of colorectal cancer care.

2.22 Polyp cancers

Population screening for colorectal cancer will lead to the detection of more polyp cancers. Completeness of excision is easier to determine for those with a stalk than for sessile lesions (Appendix 8). If there is doubt about completeness of the original excision, repeat endoscopic examination is recommended within three months of the index procedure and if the previous polypectomy site is identifiable at this examination, biopsy of the polypectomy site and tattooing of the area are recommended. A further endoscopic examination of the area is recommended after a further 6 months. If the area appears healthy at this time the patient should revert back to adenoma surveillance.

2.23 Survival rates.

Thirty years ago, the overall 5 year survival rate for colorectal cancer in the UK was in the region of 38%. Data from the Birmingham Cancer Registry between 1977 and 1981 indicated that after curative resection, 5-year age-adjusted relative survival rates for colon cancer were 85%, 67% and 37% for Dukes' stage A, B, and C respectively. For rectal cancer, the equivalent figures were 80%, 55% and 32%.

More recent figures show that the overall age-standardised survival rates for colon and rectal cancer for 1986-1990 were 40 and 38% respectively. For 1996-99, these figures were 48 and 49% respectively (CRUK 2006 III). These data do not separate out the patients whose cancer is so far advanced that curative resection is not possible, and whose life expectancy is therefore short (about 50% of the total), nor do they allow for stage. Comparative data with either mainland Europe or North America should be viewed with some care since all the variables involved in audits are not always taken into account.

A study of 2269 patients undergoing resection for colorectal cancer in hospitals in central Scotland between 1991 and 1994 showed that cancer-specific survival was lower in socially deprived patients.

This difference was not accounted for by the stage of disease at presentation and type of operation. This excess mortality was confined to patients undergoing apparently curative resection. In another study of 3200 patients undergoing surgery between 1991 and 1994 in Scotland, an excess of both cancer-related and intercurrent death was found in men.

More than a quarter of patients over 90 died within 30 days of their surgery compared with just over 10% of those aged between 80 and 89. Clearly these outcomes also relate to co-morbidity which increases with age. These figures are very similar to those reported from Holland between 1987 and 2000 where the 30 day postoperative mortality increased from 8% for the age group 80 – 84 to 13% for those 85 – 89 and 20% for nonagenarians.

Each MDT should audit the survival rates of the patients they manage. Data from each hospital should be submitted both to Cancer Registries and to the National Bowel Cancer Audit Programme (NBOCAP). Audit should include both clinical information and non-clinical variables such as socio-economic status.

2.24 Histopathology for Colorectal Cancer

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, 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.

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.

Careful and accurate pathology reporting of colorectal cancer resection specimens is vital because pathology reports are used to:

- confirm the diagnosis
- inform prognosis
- plan the treatment of individual patients
- audit pathology services
- evaluate the quality of other clinical services, notably radiology, surgery and oncology
- collect accurate data for cancer registration and epidemiology
- facilitate high quality research

- plan service delivery

A detailed recommendation by the Faculty of Pathology, RCPI and RCPath is included in it's entirety in Appendix 8. Data from the pathology report is included in the IACP key performance indicators (Appendix 5) and absence of a required parameter is also included to audit pathology standards in cancer centres.

3 Guidelines for the management of anal cancer

Anal cancer is a rare disease, accounting for 1 – 2 % of gastrointestinal malignancies. The annual incidence is 1 per 100,000. Squamous cell carcinoma or epidermoid carcinoma is the commonest form and may sometimes be treated without surgery. Rarer types of anal malignancy include adenocarcinoma of the anal glands, small cell and undifferentiated carcinoma, which should be treated as low rectal carcinomas. Conversely there is no evidence that rectal excision is of benefit for anal melanoma.

Squamous cell cancer may affect the mucosa of the anal canal or the skin of the anal margin. Distal anal cancers have a large cell keratinising morphology. Cloacogenic (basaloid transitional cell tumours) are nonkeratinising and usually occur in the upper anal canal. The behaviour and treatment of these types is similar. Squamous cell cancers of anal canal have different pathological spread to low rectal adenocarcinoma and are staged differently. Squamous cell cancers of the anal margin, which are distal to the anal verge and involve the hair-bearing area, are classified and treated as skin tumours. Predisposing factors for anal squamous carcinoma have been identified as HPV infection (subtypes 16,18 and 31), HIV and immunosuppression.

3.1 **Presentation & Diagnosis**

Anal cancer usually presents as a mass or ulcer, and suspicious lesions should be biopsied. Patients may also present with groin lymphadenopathy. Anal cancer may be detected as a finding following histopathological examination of an anal lesion, making a high index of clinical suspicion an essential prerequisite for diagnosis of these lesions. HIV testing should be considered in homosexual males and those at risk of contracting HIV. HIV status has implications relating to sepsis, toxic effects of chemoradiotherapy and future management. Sexually transmitted infection appears to be a significant cause of anal cancer. Human papilloma virus (Serial type 16 and 18) is associated with anal intraepithelial neoplasia (AIN). This may proceed to invasive cancer although the risk is not known. Others with immuno-suppression, particularly HIV infection, are also at risk; among HIV positive homosexual men, the incidence of AIN is over 36 %. Smoking is a risk factor for anal cancer.

3.2 **Staging**

Tumours of the anal margin, which are distal to the anal verge and involving the hair-bearing area, are classified in the same way as skin tumours. Anal cancer spreads via the lymphatic system and to a lesser extent by the blood stream. Tumours of the distal anal canal (below the dentate line and anal verge) drain to the inguinal nodes; femoral nodes and thus to the external iliac system. The lymphatics of the proximal anal canal drain to the mesorectal nodes, then along relevant branches of the inferior mesenteric artery and thus to para aortic nodes. They also drain to the internal iliac and obturator nodes. TNM staging for anal cancer has a different basis from low rectal cancers. It is based on size (T1-T3) and in the case of T4 lesions, invasion of the adjacent organs. The N stage (regional lymph nodes) reflects the pattern of lymphatic spread. The AJCC-TNM staging system is used.

3.3 **Pre-treatment staging**

- Clinical. It is often necessary to perform an examination under anaesthetic to assess the stage of the anal cancer and to biopsy it. Assessment can be documented in a diagrammatic form. An accurate assessment of size is required for staging (TNM) and to determine prognosis.

- Endo-anal ultrasound has been used to assess the anal sphincters for benign disease and in low rectal cancers. It stated advantage is an accurate assessment of the depth of tumour in relation to the anal sphincter. Endo-anal techniques can be painful; the imaging field of view is limited and mesorectal lymph nodes may be missed. It is most likely to be accurate in early disease (T1 and T2) that has not spread beyond the external anal sphincter. There are claims that 3D endosonography improves nodal detection. Ultrasound may improve the accuracy of clinical staging.

- MR imaging. Anal carcinoma may be assessed using a pelvic-phased array MR coil, similar to that used to assess rectal adenocarcinoma of the anorectal junction. The ability to demonstrate sphincter anatomy using either endo-anal coils or high spatial resolution external surface pelvic phased array coils have been described. Imaging is increasingly employed to define disease extent to aid treatment planning, for the follow up of patients undergoing chemoradiation, and in the surveillance of patients to detect relapse. Clear pretreatment delineation of pelvic disease enables optimal planning of radiotherapy to the target volume. Post treatment assessment can be useful to document tumour regression and, in patients that fail to show a response or have recurrent disease, the technique enables delineation of disease for possible salvage surgery.

- Distant metastases can be detected by using CT scanning. 40% of patients develop distant disease in the chest and abdomen.

- Enlarged groin lymph nodes can be assessed by fine needle aspiration (or biopsy), if necessary under ultrasound guidance. A high proportion of enlarged groin nodes in patients with anal cancer will show reactive changes only.

3.4 **Residual / recurrent disease**

Patients being considered for salvage surgery should be restaged with:

- Pelvic MRI for the extent of local disease. There may be difficulties in differentiating disease from radiation effects, even using a combination of ultrasound and MRI.

- CT chest/abdomen for distant metastases. Approximately 10% of patients who undergo chemo-radiotherapy do not respond fully, and most local treatment failures are apparent within 18 months of starting combined therapy. Local persistence or recurrence of disease is usually digitally palpable even before it becomes symptomatic. However, differentiation between complications of radiation and recurrence can be difficult and it may be necessary to perform a biopsy under anaesthetic, although this may precipitate radio necrosis.

- Following chemoradiotherapy, MRI is able to demonstrate tumour regression and document sustained response but this finding is based on a relatively small series of patients. However, since the imaging experience in low rectal cancer staging can be readily applied to anal tumours and relationship of tumour to the anal sphincter complex can be defined more clearly by imaging than by clinical examination, it is proposed that patients with anal cancers should be imaged using high resolution MRI at baseline and following chemoradiotherapy.
- PET scanning may be of value for detecting distant metastases or local spread after chemo-radiotherapy.

3.5 **Treatment**

Standard treatment for most patients with anal cancer is chemoradiotherapy. Currently, the radiotherapy schedule used is 45 Gy in 25 fractions plus a boost or as per the ACT II protocol i.e. 50.4 Gy in 28 fractions. Until the late 1980's, surgical excision was used to treat primary anal cancer. Chemoradiotherapy was adopted as standard after its effectiveness was demonstrated in the first UK trial of treatment for anal cancer (ACT I). By the early 1990's the results of this trial and separate trials run by the EORTC (European Organisation for Research and Treatment of Cancer) and RTOG (Radiation Therapy Oncology Group) were available. ACT I was the largest of the 3 trials and, like the EORTC trial, compared radiotherapy to the same radiotherapy with 5-fluorouracil (5-FU) and mitomycin C (MMC) during the first and final week of the first radiotherapy course. The trial established chemoradiation as the treatment of choice for the majority of patients with the disease, even though there was no significant difference in overall survival at 3 years (58% with RT vs 65% for chemo radiotherapy ($p = 0.25$).

3.6 **Ongoing studies and current practice**

Following the closure of these trials, several pilot studies were conducted to test alternative treatment schedules and dose escalation of either chemotherapy or radiotherapy, with the aim of improving prognosis in anal cancer. When designing the second UK trial (ACT II), a primary aim was to avoid the 6-week radiotherapy gap in the previous trial, to unify UK practice. This trial uses a continuous 2 phase schedule of 50.4Gy in 28 fractions, and compared 5-FU/MMC with 5-FU/CDDP. Chemotherapy is given during the first and fifth weeks of radiotherapy. Patients receive whole pelvic radiotherapy to include the tumour and involved nodes with a 3 cm margin to include inguinal, internal and external iliac nodes using an opposed parallel pair field arrangement. They then receive a second phase with a shrinking field to include tumour and involved nodes with a 3 cm margin only. The whole pelvic dose is 30.6 Gy and the dose to the second phase treatment field is 19.8Gy. Patients are randomised to 2 additional courses of chemotherapy or follow up alone following chemo radiation. Irrespective of the drug combination given during chemo radiation, 5-FU & CDDP are given as maintenance. It is recommended that outside of the trial patients receive the same radiotherapy treatment using either the 5FU/MMC or 5FU/CDDP at the clinician's discretion, but without any additional chemotherapy following radiotherapy.

3.7 **Frail & Elderly patients**

EXTRA, a phase II trial which closed in September 2006 combined oral chemotherapy (capecitabine, mitomycin C) and the ACT II radiotherapy schedule. It is hoped that the oral schedule will reduce hospitalisation and be simpler for patients, particularly the elderly. This group of patients might also be adequately treated with a reduced radiation dose. Further studies are required to determine whether these encouraging results can be maintained.

3.8 **Current Treatment for Relapse**

In ACT I, approximately 30% of patients relapsed after primary treatment with chemoradiation. Of these relapsed patients, approximately half were suitable for surgery. The other half therefore might have benefited from further palliative chemotherapy. The choice of mitomycin or cisplatin depends on which drugs were used in the initial therapy. For inoperable patients who have had 5-FU/CDDP or 5FU/MMC, there is no data on alternative treatment schedules.

3.9 **The Role of Surgery in Anal Cancer**

3.9.1 **Local excision**

T1 tumours within 2cm of the anal margin can be treated by local excision. Local control and survival rates are high with clear margins. Local excision is not recommended for any other anal tumours.

3.9.2 **Primary anorectal excision**

Before 1980, abdominoperineal resection (APR), with or without inguinal block dissection, was the standard treatment, achieving 5-year survival rates of 38-70%. Nigro et al introduced combined chemotherapy and radiotherapy in 1974 (Nigro 1974 IIb), and by the mid-1980s, achieved a 5-year survival rate of 80%, (Nigro et al 1984 IIa). Subsequently, chemoradiotherapy has become the treatment of choice for anal squamous cancers for which local excision is not appropriate.

3.9.3 **Defunctioning Stoma**

Chemoradiation offers the prospect of successful local control without a permanent stoma. Potentially temporary stomas may be appropriate for patients with either:

a) advanced tumours with loss of sphincter function before chemo radiotherapy, or

b) recto vaginal fistulas, or are at risk of developing such fistulas during treatment.

The reversal rate of temporary stomas is low, reflecting the frequency with which they are used for patients with advanced disease. The ACT 1 trial shows a 65% permanent stoma rate with radiotherapy alone and 61% with combined therapy.

3.9.4 **Groin lymph node dissection**

30% of patients presenting with anal cancer will have palpable inguinal nodes. Up to half of these are inflammatory. Fine needle aspiration is appropriate, possibly with ultrasound guidance. Inguinal lymph node involvement is a prognostic factor for local recurrence and impaired cancer-related survival. There are no trials of prophylactic block dissection. Many radiotherapy protocols include the groins in their treatment fields. Radiation dose to clinically uninvolved inguinal lymph nodes has been lowered in the trial protocols of the current UK ACT II study and RTOG-9811 trials. Although treatment doses have been reduced, relapse after prophylactic radiotherapy can usually be salvaged by groin dissection. Later presentation of groin involvement can be treated by radiotherapy or surgical block dissection; the latter having significant morbidity and impaired wound healing even if a myocutaneous flap is used. Block dissection may be hazardous after radiotherapy or not feasible. Sentinel node biopsy is under assessment.

3.9.5 **Salvage surgery**

The main purpose of follow up after chemoradiotherapy is to detect local failure, be it residual or recurrent disease. Before proceeding to excisional surgery, tumour recurrence or persistence should be established by biopsy under anaesthesia. The patient should be restaged (preferably with MRI and / or CT) to determine whether ano-rectal excision is likely to result in disease-free margins and whether there is no detectable distant disease, which would make excisional surgery ill-advised. The failure rate after chemotherapy is in the order of 10-30 %; half of these can be staged as potentially operable for local control, but only 50 % are potentially long term survivors. Though anorectal excision is essentially the same as for low rectal adenocarcinoma (the mesorectal nodes are excised) the skin incision should be modified according to the configuration of the tumour. Because of the differences in spread of squamous as compared to rectal adenocarcinoma there should be wide removal of the ischiorectal fossa fat. Delayed wound healing is common (42%) and consideration should be given to reconstruction with a myocutaneous flap although there is significant morbidity even after this. Without flap reconstruction, there are significant delays in wound healing and some never heal.

3.10 **Anal Cancer Multidisciplinary Teams**

Anal cancer is a rare disease and specific expertise in management is necessary to optimise outcome. The UK NICE Guidelines “Improving Outcomes in Colorectal Cancer” recommended that each network should have an ‘Anal Cancer MDT’ based within the Cancer Centre Colorectal MDT. This would ensure the necessary range of expertise for the management of these patients and allow the team to obtain specific experience in this rare disease. A similar strategy may be useful in Ireland. In the first instance, **treatment of anal cancer should be confined to rectal cancer centers**. As the primary treatment is chemo-radiation, the Multi Disciplinary Team should include at least two oncologists. This would ensure the necessary expertise for the management of these patients and allow the team to obtain specific experience in this rare disease.

- There should be one, preferably two members of the MDT who specialise in the surgery of anal cancer.
- All cases of anal cancer within the network should be reviewed by the anal cancer MDT .
- The network should define appropriate referral guidelines and ensure review by the anal cancer MDT after initial diagnosis.
- All patients being considered for surgery (including local excision) within the network should be discussed by the Anal Cancer MDT, and the surgery should be undertaken by designated surgeons who are members of the MDT and have a special interest in anal cancer.
- Pathology should be reviewed by the nominated Anal Cancer MDT pathologist.
- The MDT may occasionally need to seek advice from a gynaecological oncologist with experience in vulval cancer (HPV conditions), and a plastic surgeon.
- Persistent disease, recurrence or relapse should be discussed by the Anal Cancer MDT. Clinical staging should be undertaken by the MDT oncologists and surgeons at the meeting (according to protocol) and reviewed by the MDT radiologists.
- Management of anal cancer within a designated network Anal Cancer MDT should improve the quality of treatment. It will allow the audit of short and long-term effects of treatment in comparison with results between networks.
- Registration of cases through the network's pathologists with the Anal Cancer MDT for each network will allow the necessary data to be collected.
- Significant deficiencies of clinical staging, imaging and pathology have been demonstrated by national audit.
- Proforma reporting will improve quality of information available for audit.
- Inclusion in clinical trials should be encouraged.

3.11 **Follow up**

The aim of follow up for anal cancer is:

1. To detect local failure after local excision or chemoradiotherapy that might be amenable to further surgery or chemoradiation.
2. To detect the occurrence of distant metastases, which may be asymptomatic for which early chemotherapy may improve the prognosis or long-term survival. There is little evidence to suggest an ideal protocol. Local failure is most common in the first eighteen months. This can be monitored by digital examination to assess regression of the tumour following chemo-radiotherapy. Imaging by endosonography has the advantage of being able to assess the depth

and penetration in relation to the sphincter. It has been suggested that it helps to differentiate fibrosis from recurrence. MRI can demonstrate extrasphincteric spread. CT is usually used to detect distant spread although there are problems with the detection of groin and iliac lymph modes. Monitoring of lymph nodes is usually performed clinically but FNA or ultrasound may help. The outpatient follow up protocol outlined in the ACT 1 and ACT 2 trials are widely adopted i.e. outpatient follow up two monthly for a year, three monthly for a second year and then every six months. Digital examination of the anus should be performed at each review appointment.

3.11.1 **Suggested imaging recommendations**

- Careful evaluation of the primary site following initial treatment should include clinical examination with examination under anaesthesia and or MRI scanning where there is concern that residual disease remains. If residual disease is demonstrated full staging including CT of chest and abdomen is required before proceeding to salvage abdomino-perineal resection.
- CT surveillance to detect distant metastases based on clinical suspicion. 40% of patients will develop distant disease in the chest and abdomen.
- MRI surveillance if clinically suspicious of residual disease. 10% fail to respond to preoperative chemo radiotherapy and most local relapses are detected within the first 2 years after treatment.

3.12 **Prognosis and Survival**

Randomised trials have not shown any overall survival advantage of chemoradiotherapy (CRT) over RT alone. Overall three-year survival was 65% with anal cancer related mortality of 39%. The 5 year survival was 50% and the 5 year local failure rate was 46%. Of the local failures in the ACT I study only 58% were suitable for salvage surgery. The EORTC reached a similar conclusion although with a smaller number of patients (110 compared with 577). There is a significant relationship of tumour depth to 5 year and overall survival. When the disease was confined to sphincter muscles, the local and overall recurrence rate was 23%, but when the tumour invaded through the sphincters, the local and overall recurrence rates were 48% and 53% respectively.

Depth of invasion increased with larger lesions and nodal involvement was uniformly frequent in lesions > 2cms. After adjustment for stage, tumour diameter failed to remain a significant independent prognostic variable. For patient information and illustrative purposes, the findings of Cummings et al 2003, in a non randomized studies of radiation 5FU and mitomycin, can be used to give indicative rates of local recurrence in a 5 year survival as follows:

T1 lesions have a 90-100% local control with80% five year survival. T2 lesions have 65-75% local control and 70% five year survival. T3 or T4 lesions have local control rates of 40-50% and five year survival of 45-55%.

3.13 Histopathology Reporting

This section should be read in conjunction with Appendix 8 of these Guidelines. The Welsh audit of anal cancer demonstrated poor documentation overall. Use of structured proformas has been shown to improve histopathology reporting. When a local resection is performed, the size of the lesion (usually anal margin) should be documented together with lateral and deep resection margins. One possible role of the pathologist is to register anal cancers with the local cancers surveillance unit. Specimens, which do not have clear margins, should be brought to the attention of the network anal cancer MDT. If a resection has been performed this will usually be an abdominoperineal resection for persistent disease following chemoradiotherapy, recurrence or complications. Cut up of the specimen should concentrate on size, depth of invasion (in relation to sphincters), involvement of adjacent organs and circumferential resection margins. The histology type is usually squamous but other varieties should be recorded. TNM staging is somewhat different compared to rectal adenocarcinoma invading the anal canal. Pathological T staging essentially relates to size; and on clinical staging to invasion of adjacent organs and pattern of lymph node spread. pT1 to pT3 relates to size but pT4 is any size that invades adjacent organs. Invasion of the sphincter muscle is not classified as pT4.

In relation to Regional Lymph Nodes, N1 is a nodal involvement in the mesorectum; N2 is unilateral internal iliac/inguinal lymph nodes only; N3 is involvement of the mesorectal/inguinal, bilateral internal iliac and / or inguinal lymph nodes. If the patient has had neoadjuvant treatment the staging should show the prefix “yp”. The pathological findings should be reported using a proforma. The following is a staging system for anal cancer described by the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer.

3.14 Anal Cancer TNM Staging

Primary tumor (T)

TX: Primary tumor cannot be assessed

T0: No evidence of primary tumor

Tis: Carcinoma in situ

T1: Tumor 2 cm or less in greatest dimension

T2: Tumor more than 2 cm but not more than 5 cm in greatest dimension

T3: Tumor more than 5 cm in greatest dimension

T4: Tumor of any size that invades adjacent organ(s), e.g., vagina, urethra, bladder*

[Note: *Direct invasion of the rectal wall, perirectal skin, subcutaneous tissue, or the sphincter muscle(s) is not classified as T4.]

Regional lymph nodes (N)

NX: Regional lymph nodes cannot be assessed

N0: No regional lymph node metastasis

N1: Metastasis in perirectal lymph node(s)

N2: Metastasis in unilateral internal iliac and/or inguinal lymph node(s)

N3: Metastasis in perirectal and inguinal lymph nodes or bilateral internal iliac and/or inguinal lymph nodes

Distant metastasis (M)

MX: Distant metastasis cannot be assessed

M0: No distant metastasis

M1: Distant metastasis

AJCC stage groupings

Stage 0	Tis, N0, M0
Stage I	T1, N0, M0
Stage II	T2, N0, M0 or T3, N0, M0
Stage IIIA	T1, N1, M0 or T2, N1, M0
	T3, N1, M0 or T4, N0, M0
Stage IIIB	T4, N1, M0 or Any T, N2, M0 or Any T, N3, M0
Stage IV	Any T, any N, M1

4 Summary

4.1 Summary of Recommendations for Future Development of Colorectal Cancer Surgery in Ireland by the Irish Association of Coloproctology

The government document **A Strategy for Cancer Control in Ireland (2006)** established the **National Cancer Control Programme**. Eight cancer centres were designated, namely Beaumont Hospital, Cork University Hospital, Limerick Regional Hospital, Mater Misericordiae University Hospital, St James' Hospital, St. Vincent's University Hospital, University College Hospital Galway and Waterford Regional Hospital. The **NCCP** initially suggested that colon cancer surgery should be confined to the 8 cancer centres and that all rectal cancer surgical services should be provided in 4 hospitals, one in each network.

Colorectal cancer is common with 2184 new cases in 2005 (National Cancer Registry). The separation of colon cancer from rectal cancer is somewhat arbitrary with considerable overlap between the two in relation to the training necessary for surgeons and the support services required by patients. **Rectal cancer is defined as a tumour of the bowel where the lower border of the tumour is within 15cm of the anal verge on rigid sigmoidoscopy, whereas colon cancer refers to all other malignant tumours of the large bowel.** Both groups of patients benefit from expert colorectal surgical care provided with the support of a multidisciplinary team but the case for centralisation is more compelling for rectal cancer. Although the NCCP supports centralisation of all colon cancer surgery into the 8 designated cancer centres, resources in these centres are currently insufficient to deal with the expected numbers of patients. These patients are currently cared for by general and colorectal surgeons on call in most hospitals around the country. These surgeons also provide a broad spectrum of other emergency general surgery services and centralisation of every experienced colonic surgeon would result in a substantial deficit in the provision of emergency surgical services in hospitals that are not designated as cancer centres. It is not currently possible to recommend centralisation of colon cancer surgery but **a National Colon Cancer Surgery Audit is urgently required.**

The **Irish Association of Coloproctology (IACP)** participated in a national audit of rectal cancer surgical services in conjunction with the **Royal College of Surgeons in Ireland (RCSI) and** the **National Cancer Registry (NCR)** to obtain data about current surgical services for rectal cancer**.** The **2007 RCSI National Rectal Cancer Surgery Audit** provides accurate independent verification of the number of rectal cancer operations performed nationally and some data relating to quality of care. The **2007 RCSI National Rectal Cancer Surgery Audit** identified 558 new rectal cancer patients treated by surgeons, of whom 446 were treated by resection. While the 2007 data is a useful starting point, the incidence of colorectal cancer is expected to increase due to an aging population, better bowel cancer awareness and improved diagnostic techniques. Centralisation of surgery for such rectal cancer will require an emergency service to be available to treat the 10% of patients who present as an emergency. Any proposed centralisation process must take into account the necessity for provision of expert colorectal surgical services for benign disease. Centralisation of rectal cancer surgery without also considering surgical services for complex benign pelvic colorectal conditions is dangerous. The skill set required by rectal cancer surgeons is identical to that required to treat complex benign pelvic disease, including Crohn's disease, ulcerative colitis and diverticular disease. While benign disease is outside of the remit of the current

recommendation, the IACP believes the arbitrary separation of complex benign and malignant colorectal conditions is not in the best interest of either group of patients. **Rectal cancer patients must continue to be treated in fully functioning and appropriately resourced departments of colorectal surgery in order to achieve best outcomes.**

The RCSI National Rectal Cancer Surgery Audit identified 558 new rectal cancer patients treated by surgeons, of whom 446 were treated by resection. This independently verified number is substantially larger than the estimates available at the time of establishing the NCCP in 2006. The IACP agrees that centralisation of rectal cancer surgery is required but considers that confining rectal cancer surgery to four centers is neither feasible nor necessary. The RCSI National Rectal Cancer Surgery Audit identified 18 surgeons who treated one rectal cancer patient each in 2007. Low volume practice of this nature is clearly associated in the literature with worse outcomes and cannot be supported. An appropriately skilled multidisciplinary team is a valuable resource and it is both impractical and uneconomic to convene the necessary multidisciplinary team meetings for small numbers of patients. At the opposite extreme, restricting rectal cancer surgery to 4 centres would result in unnecessarily prolonged waiting times for rectal surgery due to the caseload of rectal cancer patients requiring treatment in each center and resulting pressure on limited bed capacity. It would also result in depletion of skilled staff, such as stoma care nurses and colorectal nurse specialists, from other cancer centers with a consequent adverse effect on the care of patients with colon cancer and complex benign disease in non-rectal cancer centers. The large number of rectal cancer resections in 2007, 446 operations, indicates that a greater number of rectal cancer centers could be designated while still meeting the requirement for high volume practice to ensure a uniformly high quality service. Confining rectal cancer surgery to a larger number of centers makes better use of existing national colorectal surgical manpower as well as existing diagnostic and therapeutic equipment.

The IACP is of the view that centralisation should take place in a phased manner. **Reconfiguration of services must not result in a reduction or compromise of the current standard of care provided to patients.** Low volume centers should stop performing rectal cancer surgery immediately. Specialist colorectal units should be the focus for all future rectal cancer-related appointments and developments. Non-designated hospitals should be actively integrated into rectal cancer centers to the greatest extent possible. A small number of non-designated hospitals have sufficiently high volume practice that their integration into cancer centers will pose some logistic challenges. These non-designated hospitals currently have the appropriate staff and equipment to treat rectal cancer and are currently treating a substantial percentage of rectal cancers. We propose that such non-designated centers should be allowed to continue to provide rectal cancer services in partnership with a designated rectal cancer center.

Colorectal cancer surgery in every hospital should be subject to mandatory participation in audit and all future decisions in relation to colorectal cancer surgery provision should be made on the basis of robust outcome data. **Every Irish citizen has an equal right to expect high quality colorectal cancer surgical services, whether they avail of public or private treatment, and each has the right of access to a cancer center.** National audit is urgently required to assure the public of the quality of the services provided in both sectors.

The following are the unanimous recommendations of the expert group:

1. The expert group unanimously recommends that rectal cancer surgery should not be performed in hospitals where fewer than 20 rectal cancer operations are carried out annually.

2. Rectal cancer surgery should be performed in all eight (8) designated cancer centres provided that

    a. the centre has > 20 patients operated on for rectal cancer each year.

    b. the centre treats patients to agreed national standards.

    c. the operating surgeon is trained in rectal cancer surgery, including TME.

    d. the centre has a named lead surgeon responsible for rectal cancer surgery.

    e. the centre has a fully functioning department of colorectal surgery, delivering services for both benign and malignant disease.

    f. every rectal cancer patient is discussed at a fully functioning multidisciplinary meeting including specialists in surgery, pathology, radiology, medical oncology, radiation oncology and nursing.

    g. the centre facilitates the integration of future rectal cancer surgery services at the centre.

    h. the centre participates in national rectal cancer audit, including data from named satellite units in their network and reports their outcomes to the Association of Coloproctology of Great Britain and Ireland (ACPGBI) database.

3. Rectal cancer surgery may be performed in a small number of high volume non-designated hospitals (satellite units) as an interim measure provided that

    a. every rectal cancer patient is discussed at a fully functioning multidisciplinary meeting including specialists in surgery, pathology, radiology, medical oncology, radiation oncology and nursing located in one of the designated cancer centres for that network.

    b. each hospital designated as a satellite unit has > 20 patients operated on for rectal cancer each year.

    c. the centre treats patients to agreed national standards*

    d. the operating surgeon is trained in rectal cancer surgery, including TME.

    e. the centre has a fully functioning department of colorectal surgery, delivering services for both benign and malignant disease.

    f. the satellite unit participates in national rectal cancer audit through the designated cancer centre.

    g. the satellite unit has a named lead surgeon responsible for rectal cancer surgery and for coordination of services between the satellite unit and the designated cancer centre.

    h. the satellite unit agrees to work towards full integration of rectal cancer surgery services into the designated cancer centre in a phased manner and on an agreed timetable

The National Cancer Control Programme (NCCP) has designated eight cancer centres, namely Beaumont Hospital, Cork University Hospital, Limerick Regional Hospital, Mater Misericordiae University Hospital, St James' Hospital, St. Vincent's University Hospital, University College Hospital Galway and Waterford Regional Hospital. Each of these hospitals should provide rectal cancer surgical services.

In addition, the 2007 RCSI National Rectal Cancer Surgery Audit shows that more than 20 rectal cancer resections per annum were performed in each of 5 further hospitals. These hospitals are the Adelaide and Meath Hospital (incorporating the National Children's Hospital), Connolly Hospital, Mayo General Hospital, Mercy University Hospital and Wexford General Hospital. These hospitals should continue to provide rectal cancer surgical services as satellite units in accordance with the guidelines above.

Implementation of these recommendations will reduce the number of hospitals providing rectal cancer surgical services from 31 in the 2007 audit down to 13 immediately. Phased reduction of the number of satellite units from the initial number of 5 should occur as soon as feasible. **Development of prospective audit systems is a necessary part of the rationalisation of rectal cancer services and should be prioritised for investment and development to allow evidence-based evaluation of service quality and future development of rectal cancer surgical services.**

A **Rectal Cancer Expert Working Group** was established to develop national guidelines for management for patients with colorectal cancer. The aims of the group were to agree appropriate standards of care for rectal cancer that could be adopted in all cancer centres and to identify performance indicators to allow meaningful and relevant audit structures to be developed for the purpose of quality assurance.

Prerequisites for a Functioning Specialist Rectal Cancer Centre

Delivery of a high quality rectal cancer surgery service requires development of centres of excellence with teams of surgeons and support staff working together in appropriately resourced facilities to ensure that patients receive a high quality service. Detailed staffing and infrastructure requirements are outlined in this document. **A Rectal Cancer Multidisciplinary Team is a key resource that must be available in every designated Rectal Cancer Specialist Centre.** The membership and functioning of such a team is detailed in this document but must include at least two specialist colorectal surgeons who have been trained in, and maintain a special interest in, techniques relevant to colorectal cancer, and who can demonstrate a high level of skill in this area. **Each surgeon performing rectal cancer surgery should carry out a minimum of 20 colorectal resections per annum.** Every team also requires specialists in medical and radiation oncology as well as a radiologist and histopathologist with colorectal expertise. Other consultants and nurse specialists are also required. The MDT meeting requires dedicated administrative support. MDTs should maintain close contact with other professionals who are actively involved in supporting the patient or carrying out the treatment strategy decided by the core team known as the extended team.

4.2 Summary of Quality Assurance Guidelines for the Management of Rectal Cancer in Ireland

Colorectal cancer is a varied disease with many presentations and huge variation in possible treatment exists. Common to all treatments is the need to provide care of the highest quality, consistent with international standards, delivered in a way that is accessible, effective and efficient. The purpose of guidelines is not to create a rigid framework where reasonable difference of opinion exists, but to help to set standards of care.

In a climate of restricted resources, prioritization of key performance indicators is essential to provide a quality assured service without reducing the amount of time and resource available for provision of direct patient care. The Rectal Cancer Expert Working Group devoted significant time to prioritisation of key performance indicators that have the potential to measure the most important aspects of clinical care of patients with rectal cancer in the most efficient manner. The required basic data include number of patients diagnosed, age at diagnosis, gender, radiologic stage of cancer at presentation, ASA grade, mode of presentation (emergency, urgent or elective) and position of tumour at rigid sigmoidoscopy (0-5, 6-10, 11-15cm). **The following Key Performance Indicators must be collected**:

1. Crude length of stay (date of admission to date of discharge)
2. Unadjusted operative and procedural 30 day mortality (all cause mortality in the 30 days from the date of patient's operation or stent)
3. Distal margin positivity (yes/no/not reported)
4. Radial margin positivity (yes/no/not reported)
5. Nodal harvest (number of positive nodes and total number of nodes)
6. APR rate
7. Return to theatre rate (return to theatre during hospital stay for any reason, including central line insertion)
8. Clinical leak rate
9. Radiotherapy use (% neo-adjuvant % adjuvant)
10. Re-admission rate

It should be noted that the current performance indicators focus on surgical treatment and diagnosis and similar key performance indicators will be necessary for other therapies including chemotherapy and radiotherapy.

Rectal cancer is defined as a tumour of the bowel where the lower border of the tumour is within 15cm of the anal verge on rigid sigmoidoscopy. The National Cancer Control Programme has instructed that patients with rectal cancer should be treated by a colorectal surgeon in a designated rectal cancer centre. **Patients with colon cancer may also benefit from care by a colorectal surgeon and as a minimum should be treated by a general surgeon who is experienced in the care of patients with colon cancer.**

Investigation for suspected colorectal cancer must be done promptly. Most patients present with rectal bleeding and/or an altered bowel habit. Persistence of such symptoms for more than 6 weeks warrants urgent referral. Other symptoms may include tenesmus, mucous per rectum and weight loss. Digital rectal examination should be an essential part of examination of any patient presenting with lower GI symptoms above the age of 40 years, and of anybody below this age with persistent symptoms. **A fast**

track system for referral of patients with suspicious symptoms or confirmed cancers must be established in each cancer centre. Such systems should be standardized nationally and **web-based electronic referral systems should be implemented as a priority**.

Patients presenting electively with symptoms suggestive of colorectal cancer should have physical examination, digital rectal examination and complete examination of the large bowel. Colonoscopy is the gold standard because it allows both histologic diagnosis and some therapeutic procedures. Certain quality standards must be met for all investigations, whether they take place in a designated cancer centre or not (Appendix 6). **Every patient with suspected rectal or sigmoid colon cancer, and all patients with tumours within 35cm of the anal verge on flexible endoscopy, should have rigid sigmoidoscopy.** Histological confirmation of cancer should be considered mandatory, in all but exceptional cases.

Patients where the lower border of the tumour is less than 15cm from the anal verge should be referred to a colorectal surgeon at a designated Rectal Cancer Specialist Centre. The referral of patients should not be delayed for further staging investigations but instead the performance of staging investigations should be coordinated by the Rectal Cancer Nurse Specialist in the designated Rectal Cancer Specialist Centre to which the patient has been referred. Patients diagnosed with rectal cancer should be seen at the **Rectal Cancer Specialist Centre** within two weeks of receipt of a referral. Each patient should have access to a named Rectal Cancer Nurse Specialist. A detailed Family History must be taken.

Investigations for the Preoperative Staging of Rectal Cancer

Accurate determination of the position of a rectal tumour is a critical step in selecting an appropriate operative strategy. **Every patient with rectal cancer should have a rigid sigmoidoscopy performed by a consultant colorectal surgeon to measure the distance of the tumour from the anal verge prior to any therapeutic intervention. This distance should be clearly recorded to the nearest centimetre.**

High resolution MRI should be undertaken to assess pelvic and mesorectal nodal involvement and the proximity of the tumour to the circumferential resection margin. Rectal endosonography is particularly valuable in early tumours and where local excision is being considered. **Preoperative staging MRI and endorectal ultrasound scanning should normally be performed in the designated Rectal Cancer Specialist Centre** for quality assurance purposes, to allow development of specialist radiologic expertise in rectal cancer and to facilitate the personal involvement of the Consultant Radiologist in the preoperative MDT meeting where determination of the treatment strategy will be agreed.

Pre-operative staging using a CT scan of the thorax, abdomen and pelvis should be normal practice. Patients with indeterminate lesions or atypical primary rectal cancer may benefit from PET scanning. Patients who are candidates for an extended resection (such as *en bloc* sacrectomy or pelvic exenteration) and all patients undergoing elective surgery for recurrent colorectal cancer should have a PET scan.

Treatment of Patients with Rectal Cancer in the Designated Rectal Cancer Specialist Centre

Given the primacy of surgery in the curative treatment of colorectal cancer, this document necessarily focuses to a greater extent on the discipline of surgery but **all members of the rectal cancer multidisciplinary team should ensure that their standards of practice meet international norms**, that they audit their practice and that due attention is paid to their continuing professional development. **Every patient with a diagnosis of rectal cancer should have the benefit of a colorectal surgical opinion before treatment is commenced, even if their treatment strategy may not include primary surgery, and their management should be discussed by the multidisciplinary team.**

Patients with rectal cancer must be discussed at a preoperative multidisciplinary meeting in all but the most urgent cases. Surgery for colorectal cancer should be avoided if the hazards are deemed to outweigh the potential benefits. **Participation in ACPBGI colorectal cancer audit is a requirement for all designated rectal cancer centres.** The IACP believes that both colon and rectal cancer outcomes should be subject to audit.

Preoperative Rectal Cancer MDT Meeting and Preoperative Chemoradiation

Significant improvements in the locoregional control of resectable rectal cancer have been achieved by accurate preoperative staging, total mesorectal excisional (TME) surgery and proforma pathology reporting, particularly the recognition that achieving a clear circumferential resection margin (CRM) is the primary aim of the team. In broad terms, patients will be stratified into three categories (early stage, intermediate stage and advanced stage). The potential risks and benefits of preoperative radiation and chemotherapy should be considered at the preoperative MDT meeting for every patient with rectal cancer. Such therapy is most likely to be beneficial in patients where the circumferential resection margin is predicted to be positive on preoperative MRI but may also be valuable in T3/4 or node positive tumours. **Radiation should be administered preoperatively to reduce morbidity, with postoperative radiation of rectal cancer a rarity.** Short course radiation may be appropriate where a negative CRM is predicted whereas long course treatment is necessary if a downstaging effect is required. After the preop MDT meeting, patients will either be referred for neoadjuvant radiotherapy and /or chemotherapy or will proceed directly to surgery. Radiotherapy should commence within 2 weeks of referral from the MDT meeting. **MDTs should prospectively audit the outcomes of all patients with rectal cancer managed by the team in terms of curative resection rate (R0), postoperative morbidity and mortality, locoregional recurrence and overall survival.**

Inoperable primary disease is associated with a poor prognosis. Combined chemoradiation to downstage such tumours prior to attempted resection is the current standard approach. For patients unfit for such an approach, palliation is the objective of therapy. Surgery, endoscopic stenting, chemotherapy or radiotherapy may be appropriate in selected patients.

Rectal Cancer Surgery

Appropriate patient selection, consent and preparation for surgery is paramount. Patients with rectal cancer undergoing elective surgery should receive preoperative counselling from a Stoma Nurse Specialist and the stoma site should be marked. **The risks attached to operative treatment including, but limited to, the risk of bleeding, infection, DVT, PE, anastomotic leak, the risk of an unplanned**

stoma, urinary and sexual dysfunction should be discussed. Functional outcome should form part of the general discussion about the outcomes of treatment. It may be appropriate to discuss mortality risk and validated risk models are available to counsel patients requiring this level of information. A type and screen should be performed on every patient undergoing rectal cancer surgery with cross-matching essential if extensive surgery is planned. Bowel preparation may be used in some cases. **Patients undergoing surgery for rectal cancer are at increased risk of deep vein thrombosis (DVT) and pulmonary embolism (PE) and prophylactic measures should be employed**. All patients undergoing surgery for colorectal cancer should have antibiotic prophylaxis before incision in accordance with hospital guidelines. **With modern antibiotic prophylaxis, the rates of wound infection (presence of wound discharge with positive microbiology) following elective rectal cancer surgery should be less than 10%. Designated rectal cancer centres should establish locally relevant Enhanced Recovery Programmes.**

It is essential that surgeons treating rectal cancer are trained and experienced in all relevant operative techniques, that they perform enough operations annually to maintain their expertise, that they work in a team with other colorectal surgeons and that they participate in audit and CME activities. Focused continuing medical education (CME) for rectal cancer surgeons should be supported by the National Cancer Control Programme.

Whether the operation is open or laparoscopic, the aim of surgery is a negative circumferential resection margin and complete excision of potentially involved lymph nodes. **It is recommended that total mesorectal excision should be performed for tumours in the lower two-thirds of the rectum, either as part of a low anterior resection or an APR. In tumours of the upper rectum the mesorectum should be divided no less than 5cm below the lower margin of the tumour.** When this is done, care must be taken to preserve the autonomic nerves and plexuses on which sexual potency and bladder function depend. Perforation of the tumour during resection is associated with local recurrence and its occurrence should be documented in the operation note.

Abdomino-perineal excision (APR) should be avoided where possible in favour of anterior resection but it is necessary in certain low rectal cancers, especially where the sphincter is involved or where an insufficient distal resection margin exists. **It is recommended that the overall proportion of resectable rectal cancers treated by APR should be less than 30%**. The colorectal surgeon should indicate on the operation note whether the operation is intended to be curative or not. If residual tumour is thought to remain, it should be biopsied if possible. **Pathology plays a key role in quality assurance of rectal cancer surgery and for this reason the provision of high quality pathology services in every rectal cancer centre is mandatory.** The Royal College of Pathologists Dataset for colorectal cancer provides detailed guidelines for pathologists and it is reproduced in Appendix 8. **The term curative resection should be based on surgical and histological confirmation of complete excision. Every rectal cancer histopathology report should contain the agreed rectal cancer minimum dataset.** Surgeons should expect to achieve an overall curative resection rate of 60%, but this will depend at least in part on the stage at which patients present.

The ACPGBI recommends that surgeons should audit their leak rate which should be less than 8%. Anastomotic leakage is associated with poorer survival and a significant increase in the local recurrence rate. **There is evidence that a defunctioning stoma can ameliorate the consequences of leakage, decreasing the risk of death and need for a permanent stoma**. Postoperative function should be considered in choosing the mode of anastomosis and rectal cancer surgeons must be familiar with techniques such as colonic J-pouch, coloplasty and side to end anastomosis. The use of a cytocidal washout prior to anastomosis is generally accepted as a sensible precaution. Local resection of rectal cancer should be confined to early tumours and should only occur when it is evidence–based. Such patients should be followed closely. Irrespective of the type of surgery, operation notes should follow standard hospital protocols and should contain the agreed minimum dataset (Appendix 9).

Management of patients presenting as emergencies

Patients with rectal cancer present as emergencies in 10% of cases. Centralisation of rectal cancer surgery into designated Rectal Cancer Specialist Centres requires provision of emergency surgical services to accommodate such patients.

Emergency surgery is associated with higher operative mortality. **Patients who present acutely with colorectal cancer have a three-to fourfold increase in mortality when compared to an elective situation.** Emergency surgery should be carried out during daytime hours as far as possible, by surgeons and anaesthetists who are members of a colorectal cancer MDT. **The ACPGBI recommends an overall mortality of less than 25% of all operations performed for an emergency or urgent presentation with colorectal cancer.** It should be noted that this includes all patients undergoing colorectal cancer emergency surgery and includes both colon and rectal cancer. Operation for large bowel obstruction can usually be regarded as an urgent rather than emergency procedure, and every effort should be made to operate during the day. An emergency theatre should be available in Rectal Cancer Specialist Centres to allow this. The patient with obstruction should be carefully prepared for surgery, with adequate fluid resuscitation, monitoring and expert preoperative and intraoperative anaesthetic care. An intensive care unit or a high dependency unit should be available for postoperative and preoperative care when appropriate. Patients with obstruction are often elderly with associated co-morbidities and intestinal pseudo-obstruction should be excluded. Preoperative CT may allow detection of metastatic disease at an early stage. **Specialist rectal cancer centres should have the capacity to perform and interpret contrast enemas and CT scans on a 24-hour basis.** Patients with obstructed colorectal cancer should be considered for insertion of a colonic stent which may convert an emergency or urgent situation into an elective one. **An endoscopist skilled in colonic stent insertion should be available in every rectal cancer specialist centre.**

Despite this, surgery remains a major component of the management of this condition and poses a challenge to the operating surgeon. Distended unprepared bowel, dehydration, advanced disease and out-of-hours surgery are all factors which predispose to complications. **Selection of the procedure of choice requires operative judgement.** Primary resection and anastomosis is the preferred option for uncomplicated malignant left-sided large bowel obstruction. Subtotal colectomy and segmental resection are equally safe where there is a choice of procedure but the presence of caecal ischaemia,

perforation, a synchronous lesion or a serosal tear leads to subtotal colectomy being favoured. It is surgical common sense not to perform an anastomosis in adverse situations but most experienced colorectal surgeons would still recommend resection of the primary tumour if possible. In this context, a Hartman's procedure is the most appropriate option although such patients have a high chance of not having a subsequent reversal. Surgeons should balance the risks of more complex and time consuming primary surgery with a better long term functional outcome versus the benefits of a Hartman's operation in a critically ill patient who may benefit from a shorter operation. **In the presence of faecal peritonitis, shock, severe sepsis, an ASA IV patient or widespread peritoneal malignancy, a Hartman's procedure should be performed because of the increased risks of primary anastomosis.**

Emergency surgery for acute obstruction should be performed by an experienced surgeon who is able to perform all the available procedures for large bowel obstruction. **Individual units should submit their results of surgery for malignant large bowel obstruction for audit and such mortality data should be risk adjusted**.

Post-operative Rectal Cancer MDT Meeting

Every postoperative rectal cancer patient should be discussed at a rectal cancer MDT meeting for review of the pathological findings and planning of future treatment strategies. Accurate pathology reporting plays a critical role in quality control of rectal cancer surgery. **All components of the Minimum Pathologic Dataset (Appendix 8) should be available at the postoperative MDT meeting.**

Postoperative Adjuvant Chemotherapy and Radiotherapy

If the addition of radiotherapy to surgery is deemed necessary for rectal cancer, it should ideally be given pre-operatively. Patients with a positive CRM should nonetheless be assessed for postoperative radiotherapy by the MDT. **Adjuvant chemotherapy should be considered for every patient with node positive disease.** The patient's risk factors for relapse, their co-morbidities, performance status, any specific contraindications, and the side-effect profile of the agent(s) should all be considered in coming to a decision. Systemic chemotherapy is optimally administered under the direction of a consultant medical oncologist, within facilities conforming to national guidelines. Some patients with node negative disease may benefit from adjuvant chemotherapy. **Treatment should be evidence-based and entry into clinical trials evaluating new treatments and strategies for colorectal cancer should be actively encouraged.** Patients treated curatively for rectal cancer should be followed up in accordance with local protocols, usually with CT and colonoscopy.

Advanced Disease

Patients with locoregional recurrence in the absence of metastatic disease should be reviewed by the multi-disciplinary team for consideration of radical salvage combined modality treatment. Patients with operable metastases in the liver or lung should be considered for resection and referred to a hepatobiliary or thoracic surgeon. Patients with unresectable metastatic disease should be discussed by the MDT and should be referred to the palliative care team. If appropriate, they should also be considered for palliative chemotherapy. Careful control of symptoms is an important aspect of quality

care. **All patients should have access to specialist palliative care advice and services appropriate to their needs.**

Summary of Guidelines for the Management of Anal Cancer

Anal cancer is a rare disease, with squamous cell carcinoma its commonest form. Rarer types of anal malignancy include adenocarcinoma of the anal glands, small cell and undifferentiated carcinoma, which should be treated as low rectal carcinomas. Conversely there is no evidence that rectal excision is of benefit for anal melanoma. **Treatment of anal cancer should be confined to rectal cancer centres**. As the primary treatment is chemoradiation, the Multi Disciplinary Team should have at least than two oncologists.

Anal cancer usually presents as a mass or ulcer, and suspicious lesions should be biopsied. HIV testing should be considered. The TNM staging for anal cancer has a different basis from low rectal cancers, based mainly on size (T1-T3) and in the case of T4 lesions, invasion of the adjacent organs. Pre-treatment staging clinically and with endoanal ultrasound or MRI should be performed. CT thorax, abdomen and pelvis should be performed as 40% develop metastases. Inguinal lymph node involvement is a prognostic factor for local recurrence and impaired cancer-related survival. Enlarged groin lymph nodes can be assessed by fine needle aspiration or biopsy.

Chemoradiation is the treatment of choice for the majority of patients. Currently, the radiotherapy schedule used is 45 Gy in 25 fractions plus a boost or as per the ACT II protocol (50.4 Gy in 28 fractions). Approximately 30% of patients relapse after primary treatment with chemoradiation. Of these relapsed patients, approximately half are suitable for surgery. The other half might benefit from further palliative chemotherapy, often mitomycin or cisplatin. Local excision alone can be considered for T1 tumours within 2cm of the anal margin with acceptable local control and survival rates provided margins are clear. Local excision is not recommended for any other anal tumours. Primary abdominoperineal resection (APR) may be suitable if chemoradiotherapy cannot be administered. A defunctioning stoma is sometimes appropriate for patients with advanced tumours with loss of sphincter function before chemo radiotherapy or for recto-vaginal fistulas. The reversal rate of “temporary” stomas is low.

The main purpose of follow up after chemoradiotherapy is to detect local failure, either residual or recurrent disease. Local failure is most common in the first eighteen months. Patients being considered for salvage surgery should be restaged and confirmed by biopsy. Wide skin resection may be necessary and consideration should be given to reconstruction with a myocutaneous flap to facilitate healing. Follow up may also detect asymptomatic distant metastases, where early chemotherapy may improve long-term survival. The outpatient follow up protocol outlined in the ACT 1/2 trials is widely adopted, with outpatient followup and DRE two-monthly for a year, three-monthly for a second year and then every six months. Local control and survival rates are: T1 90-100% local control, 80% five year survival; T2 65-75% local control, 70% five year survival; T3 or T4 local control 40-50%, five year survival 45-55%.

Appendix 1

Members of the IACP Rectal Cancer EGM Group 2007

Mr Roy Maxwell	President, Irish Association of Coloproctology (chair)
Ms Deborah McNamara	Secretary, Irish Association of Coloproctology
Prof Frank Keane	President, Royal College of Surgeons in Ireland
Mr Joseph Deasy	Beaumont Hospital
Mr Martin Caldwell	Sligo Regional Hospital
Mr Paul Neary	AMNCH Tallaght
Mr Brian Mehigan	St James Hospital, Dublin
Mr Diarmuid O'Riordain	AMNCH Tallaght
Ms Ann Brannigan	Mater Hospital Dublin
Prof Ronan O'Connell	St Vincent's University Hospital
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Mr Micheal O'Riordain	Mercy Hospital Cork
Mr Richard Stephens	St James Hospital, Dublin
Mr Conor Shields	Mater Hospital Dublin
Mr Karl Schmidt	Mater Hospital Dublin
Mr Emmanuel Eguare	AMNCH Tallaght
Mr Eadhbhard Mulligan	Connolly Hospital, Blanchardstown
Mr Morgan McCourt	Cork University Hospital
Mr Kevin Barry	Mayo General Hospital
Mr Ronan Waldron	Mayo General Hospital
Mr David Waldron	Regional Hospital Limerick

Appendix 2

Members of the IACP Rectal Cancer Expert Working Group

Chair:	Ms Deborah McNamara, Secretary IACP
MMUH Representative:	Ms Ann Brannigan
Beaumont Hospital Representative:	Mr Joe Deasy
SVUH Representative:	Professor John Hyland
CUH Representative:	Mr Morgan McCourt
SJH Representative:	Mr Brian Mehigan
South East Representative:	Mr Peter Murchan
UCGH Representative:	Mr Mark Regan
LRH Representative:	Mr David Waldron
Non-designated Hospital Representative:	Mr Paul Neary
RCSI Representative:	President of RCSI, Professor Frank Keane
Pathology Representative	Prof Kieran Sheahan

Appendix 3

ACPGBI Colorectal Cancer Management Guidelines 2007 Expert Advisory Group participants

The present guidelines are adapted from the ACPGBI Colorectal Cancer Management Guidelines 2007. The original document may be found at www.acpgbi.org.uk. The ACPGBI expert group advisory participants are acknowledged for their contribution to this document.

Drafting Committee: Prof JH Scholefield (Chairman), Prof CG Marks, Prof TS Maughan, Prof NA Shepherd, Prof RJC Steele, Mr MR Thompson, Mr WJ Cunliffe, Dr I Geh, Dr M Hill, Dr A Hartley, Mr A Radcliffe, Dr E Levine, Dr A Higginson, Prof GT Williams, Prof P Quirke, Prof M G Dunlop

Association of Coloproctology of Great Britain and Ireland: Prof MG Dunlop, Mr I MacLennan, Prof D Morton, Prof JMA Northover, Prof NS Williams

Royal College of Physicians:	Prof R Logan, Prof J Rhodes
Royal College of General Practitioners:	Dr P Sutton
Royal College of Radiologists:	Dr S Taylor, Prof T Maughan (Oncology)
Royal College of Surgeons of England:	Prof JRT Monson
Royal College of Surgeons in Ireland:	Prof L Kirwan
Royal College of Surgeons of Edinburgh:	Prof R J C Steele
Royal College of Nursing:	Ms J Breeze, Ms D Campbell, Ms E Mallender
Royal College of Pathologists:	Prof P Quirke, Prof N Shepherd, Prof GT Williams
Assoc. of Surgeons of Great Britain & Ireland:	Prof JRT Monson
British Association of Surgical Oncology:	Mr KB Hosie
British Society of Gastroenterology:	Dr S Cairns, Mr R Leicester
Scottish Cancer Therapy Network:	Prof RJC Steele
The Dukes' Club:	Ms K Cross
Genetics:	Prof D Eccles
Patient Representative:	Mr A Oliver

Appendix 4

Proposals to establish Guidelines for Tumour Board meetings for Colorectal Cancer

Multidisciplinary Care in Management of Colorectal Cancer

Multidisciplinary care is an integrated team approach to health care in which medical and allied health care professionals consider all relevant treatment options and develop collaboratively an individual treatment plan for each patient.
There is increasing evidence that multidisciplinary care improves patient outcomes for colorectal cancer. The benefits of adopting a multidisciplinary approach for rectal cancer within the National Cancer Control Programme in Ireland include

- Improved patient care through the development of an agreed treatment plan
- Provision of best practice through the adoption of evidence-based guidelines
- Improved patient satisfaction with treatment
- Improved performance of health professionals
- Streamlining treatment pathways
- Reduction in duplication of services
- Improved access to possible clinical trials of new therapies
- Increasing the timeliness of appropriate consultation and surgery and a shorter timeframe from diagnosis to treatment

The purpose of this document is not to be prescriptive but rather to prompt thought about elements of best practice in establishing and maintaining MDT meetings or Tumour Boards for colorectal cancer within the cancer centre networks of the HSE

Positive Outcomes of Multidisciplinary Care for Staff

- Patient care is more likely to be evidenced-based, with implications both for clinical outcomes and cost-effectiveness
- All treatment options can be considered, and treatment plan tailored for individual patients
- Referral pathways are more likely to be streamlined
- Clinicians have enhanced educational opportunities
- Meetings provide opportunities for clinicians to interact with colleagues

- Clinicians who work as part of a team have a significantly lower incidence of work stress than seen in the general health workforce

Positive outcomes of Multidisciplinary Care for patients.

- Evidence for increased survival for patients managed by a multidisciplinary team
- Increased perception of the patient that care is being managed by a team
- Greater likelihood of receiving care in accord with clinical practice guidelines, including psychosocial support
- Increased access for information, particularly about psychosocial and practical support
- Increased patient satisfaction

Regular 'tumour board' team meetings are an integral component of multidisciplinary care. The central theme of meetings should be prospective treatment planning and tailored care for each individual patient. Other benefits of regular treatment meetings include professional development activities, development of local protocols and discussion of other relevant issues such as resolving service delivery problems. Once the team is established it may be appropriate to hold additional meetings, to discuss specific topics of interest or for professional development. Using the meeting as an educational and information-sharing opportunity, as well as for treatment planning, can help both to encourage attendance and ensure sustained interest.

Core Requirements

- Identify a respected peer leader with strong leadership and facilitation skills to enable full participation of all disciplines
- Supporting infrastructure (eg meeting room venue, facilities, equipment)
- Preparation of all relevant materials and information in advance of meetings
- Inclusion of all disciplines and mutual respect between participants leading to productive group dynamics
- Incentives for participants to attend meetings (eg education, evidence of benefits, food)
- Accurate recording and timely communication of the outcomes of case discussions to the patient, and to his/her general practitioner.

Team leadership for establishing Tumour Board meeting

Team leadership has been identified as a key aspect contributing to successful and sustainable multidisciplinary (MDT) meetings. A **meeting chair** who facilitates discussions during team meetings and a **meeting co-ordinator** who co-ordinates the logistics for meetings are both required.

Role of Chairman at Meeting

The meeting chair should rotate between specialties on a regular basis. His/Her role includes keeping the meeting to the agenda, encouraging a full range of input of opinion, summarising the discussion and recommending the written instructions of the MDT. The Chair should ensure that the contribution of each team member is heard and accorded an appropriate level of professional respect.

Role of Meeting Co-ordinator

Roles of the meeting co-ordinator include identifying patients for discussion during the meetings, organising meetings, allocating information and ensuring availability of relevant information sources for presentation at meeting, recording outcomes of case conference discussions and informing the treating clinician and/or the patient's general practitioner of the meeting outcomes. If available, administrative personnel can undertake the role of meeting co-ordinator. However, in the absence of administrative personnel, the role of meeting co-ordinator may be undertaken by another meeting attendee, such as oncology nurse, data manager or registrar.

Timing of meetings

The key to sustaining tumour board meetings is for them to become habitual, and part of the normal working week. With this in mind, meetings should be held at the same time and place to maintain routine and avoid confusion. The duration of meetings will be determined by the size of the cancer centre and the number of cases requiring discussion. In general it will be appropriate to limit the meetings to 45 – 90 minutes. Meetings should be held at a time convenient for all attendees – it is important to canvass the opinions of all attendees to ensure a mutually acceptable time. Meeting times should be planned to take account of attendance by off-site personnel. In some of the proposed regional cancer centres, some of the clinicians involved in delivery of cancer care to the cancer centre will also have significant commitments 'off site' and it will be important to hold meetings a time convenient for these attendees to be present or to participate via teleconference of videoconference. In general personal attendance at the MDT meeting should be encouraged.

The objectives of the meeting are:

- To provide an opportunity for multidisciplinary discussion of each new case of rectal cancer at diagnosis and again after resectional surgery
- To discuss each new patient with colon cancer at least once during their care

- To ensure all new patients presenting with malignancy have their case discussed by a multidisciplinary team with access to all available information about that case
- To determine the most appropriate treatment and care plan for each individual patient
- To provide education to senior and junior medical, nursing and allied health staff

Membership of Board

The multidisciplinary team meeting will at a minimum comprise a core group of:

- Colorectal Surgeons & Team
- Radiologists with interest in GI Radiology and particularly MR and CT imaging
- Pathologists with interest in GI pathology
- Radiation Oncologist with an interest in colorectal cancer
- Medical Oncologist with an interest in colorectal cancer
- Colorectal Nurse Practitioners
- Membership of the team can be extended to include other disciplines, e.g. Gastroenterologists, Urologists, Gynaecologists, Plastics Surgeon, Allied Health Professionals, Genetic Counsellors
- Junior Hospital doctors in training across the above specialties
- Data Coordinator
- IT / Officer

Attendance at the MDT meeting should be prioritised and must include the first five members of the team at a minimum.

Procedures for Tumour Board Meetings

The clinical data will be prepared in advance which will include:

- Patient identifiers
- Date of diagnosis
- Relevant medial history
- Names of surgeon, general practitioner, medical and radiation oncologist, and others
- Summary of treatment to date

- All available pathology information including slides or photographs
- All available radiological information including all images
- Psychosocial risk factors

Clinicians will place cases for presentation onto the meeting agenda by informing the co-ordinator of the relevant case details at least four days prior to the meeting.

Late inclusions to the agenda are acceptable on an emergency basis. In this instance it is the responsibility of the presenting clinician to ensure all appropriate clinical results are available to the meeting.

Case Presentation

A doctor from the team responsible should succinctly present all details of the patient's case including clinical findings and previous results.

Pathology Input

A high tech pathology imaging microscope will be available for adequate projection and review of the pathology. Pathology will be reviewed and the results interpreted by GI pathologists. All original pathology information must be available to the Lead MDT pathologist, especially when an external case is being discussed. Minimum data sets for reporting pathology findings are described elsewhere in this document.

Radiology Input

Digital radiology equipment with adequate hard drive storage capability will be available for radiology with facilities for dual projection and retrospective recall of previous imaging. Minimum data sets for reporting radiological findings and particularly for reporting MR imaging and endorectal ultrasonography are to be encouraged. These datasets will be described elsewhere by the Association.

Collation of Findings

Clinical examination, radiological findings and pathology results will be recorded. Discussion about treatment and management of each case will include relevant evidence base for disease stage, use of existing guidelines, reference to research findings and the opinions of the members of the team will be sought. In particular, radiation oncology and medical oncology overviews should be specifically sought in patients deemed suitable and appropriate for neoadjuvant pathways.

Patients suitable for entry into clinical trials should be identified. Ongoing updates of current trials to familiarise the overall membership of the group with latest practice should form part of the meeting.

All Tumour Boards must participate in local and national audit structures. Individual MDTs are encouraged to audit their results on at least an annual basis.

Recommendations from the multidisciplinary team meeting will be recorded in the patient's medical record. At minimum this should include the date of the meeting and the recommended treatment plan.

It should be noted that recommendations of the meeting are not proscriptive, the patient and his/her consultants will make final decisions about the optimum treatment plan.

A separate permanent MDT record should be kept. An attendance record for the meeting should normally be kept. No patient should be discussed in the absence of the consulting clinician or his or her delegate.

Some patients will require further evaluation at centres offering additional services including liver resection etc. It is the responsibility of the patients' consultant to make these arrangements.

Attendance of medical and other health professionals and the meeting details will remain confidential to the meeting. The clinical agenda will be destroyed following the meeting. However, any clinicians retaining the agenda are responsible for maintaining the confidentiality of the document. The team can maintain a copy of the agenda in an agreed secure manner for audit purposes.

Treatment and care recommendations from the meeting discussion will be documented in the medical record by completing the meeting pro forma. The general practitioner will be notified of the meeting's recommendations by the relevant team.

Communication with patients and families

The consultant responsible for the patient should convey recommendations of the MDT to the patient and their family to allow them to participate in decision making about ongoing treatment and care.

Appendix 5

IACP Minimum Key Performance Indicators for Rectal Cancer Surgery

A. Core Data:

1. Number of patients diagnosed with rectal cancer
2. Age of patient at diagnosis
3. Gender of patient
4. Radiologic stage of cancer at time of presentation based on CT & MRI
5. ASA
6. Mode of presentation (emergency, urgent or elective)
7. Position of tumour at rigid sigmoidoscopy (0-5, 6-10, 11-15cm)

B. Key Performance Indicator:

1. Crude length of stay (date of admission to date of discharge)
2. Unadjusted operative and procedural 30 day mortality (all cause mortality in the 30 days from the date of patient's operation or stent)
3. Distal margin positivity (Yes/No/Not reported)
4. Radial margin positivity (yes/no/not reported)
5. Nodal harvest (number of positive nodes/total number of nodes)
6. APR rate
7. Return to theatre rate (Return to theatre during hospital stay for any reason, including central line insertion)
8. Clinical leak rate
9. Radiotherapy use (% neo-adjuvant % adjuvant)
10. Re-admission rate

Appendix 6

Quality Standards of Investigations for Colorectal Cancer

Regardless of whether colonoscopy, barium enema or CT colonography are employed, certain minimum levels of quality should be achieved by all three of these investigations.

Colonoscopy

Colonoscopy should usually be performed as a day-case procedure after full bowel preparation, and the endoscopist should be prepared to biopsy or remove appropriate lesions and inject some form of permanent dye to mark the site of the polypectomy. Specialist units should be able to offer endoscopic placement of stents for obstructing lesions. Endoscopists should be able to deal with any bleeding that occurs following polypectomy. The patient must give fully informed consent and this includes warning of possible discomfort and the risks of perforation and bleeding. Colonoscopy under a general anaesthetic may be associated with a greater risk of perforation. If sedation is used, care should be taken to avoid complications arising from excessive sedation. Complete colonoscopy to the caecum can be achieved in at least 90% of cases with a perforation rate of 0.1%, but these figures have not been universally achieved.

A National Cancer Control Programme must consider the quality of diagnostic and screening tests for cancer. Guidelines and quality standards for endoscopy have been established using a Global Rating Scale (GRS) (www.grs.nhs.uk) and by the British Society for Gastroenterology document (www.BSG.org.uk) "Quality and Safety Indicators in Endoscopy". These standards set the quality for the whole of the patient journey through endoscopy, with particular emphasis on quality and training. Investment in national audit infrastructure is a priority to ensure the completeness and safety of colonoscopy. Colonoscopists should audit their performance and achieve quality and safety standards consistent with published guidelines.

Barium enema

Barium enemas should be double contrast examinations. Increasingly, radiographers are performing barium enemas. Such examinations should be double-read, with one observer being a consultant radiologist, to reduce errors in interpretation. A designated consultant radiologist should be responsible for the supervision of radiographer-performed studies. The radiographers concerned should be specially trained and work to an agreed protocol. 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 these areas properly can lead to lesions being missed. In addition, inexperience combined with failure to distend the caecum can produce misleading appearances, which can be misinterpreted as malignancy and can result in unnecessary laparotomy.

It is not always possible to be certain of the radiological findings in barium enemas for reasons including the state of the preparation and physical considerations such as the mobility of the patient and colonic anatomy including diverticular disease and overlapping loops, but non-committal reporting of barium

enemas by radiologists reduces the efficiency of this examination, which then requires further colonic imaging, usually by colonoscopy. 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. The aim should be to keep to a minimum the number of 'uncertain' reports.

A survey of radiologists examined the complications of barium enema over a two year period 1992 -94. During this period 738,216 barium enema examinations were included in this study (50% of all barium enemas performed in the United Kingdom). There was a rate of one serious complication for every 9000 examinations, perforation of the rectum occurred once in every 25,000 examinations and one death attributed to the barium enema was reported to occur in every 60,000 examinations (Blakeborough et al 1997).

Teams carrying out barium enema should audit their results and should expect to achieve a false negative rate of less than 10%. Despite good radiological techniques, however, it may be impossible to be sure of always excluding neoplasia, particularly where there is severe diverticular disease of the sigmoid colon. In such cases, supplementary endoscopy by flexible sigmoidoscopy or colonoscopy is mandatory.

CT colonography

CT colonography is increasingly being used in symptomatic patients who require total colonic imaging, and it is regarded as a robust examination for cancer detection. There is evidence that patients prefer CT colonography to equivalent investigations. Mechanical insufflation with CO_2 reduces patient discomfort and improves colonic distension and assessment of segments. A designated consultant radiologist should be responsible for the supervision of radiographer-performed studies. The radiographer concerned should be specially trained and work to an agreed protocol. Ideally this should be a radiographer with prior training in barium enema work and so possessing many of the skills required to perform the examination. The perforation rate is low (0.06 to 0.08 per cent) and may be asymptomatic but demonstrated, due to the sensitivity of CT for detection of intramural and free air. The symptomatic perforation rate is reported to be 0.03%. Perforation can usually be managed successfully with conservative treatment.

IV contrast media may be given to aid in the assessment of extraluminal organs in symptomatic individuals. Antispasmodics may be given but are not essential. Ideally, the patient should be scanned both supine and prone, but a lateral decubitus position is an option if the patient is unable to lie prone. The milliamps (mA) should be reduced for prone scanning as only luminal information is required. Image interpretation requires an expert reader. Currently there are no standards as to the number of supervised examinations required to achieve competency. The examinations should be double read. Computer Aided Diagnosis (CAD) is increasingly available as a second read of the data set, but is currently controversial. Faecal tagging may reduce the false positive rate for the reporting of small and medium sized polyps.

CT colonography is increasingly used for investigation of suspected bowel cancer, but its results should be audited with particular regard to false negative rates. CT colonography may be considered as part of the staging examination of patients with left-sided tumours, to assess the right colon at the same time.

Appendix 7

Genetic Syndromes with an Increased Risk of Colorectal Cancer

People at increased risk of colorectal cancer due to genetic factors may fall into a number of categories. The syndromes are defined and summarised in Online Mendelian Inheritance in Man (OMIM), a web-based resource detailing genotypic and phenotypic features of such syndromes. People with a greatly elevated personal risk of gastrointestinal malignancy should be identified on the basis of family history criteria and/or pathological criteria and/or presence of a pathogenic mutation in a gene known to be responsible for a colorectal cancer susceptibility syndrome. These patients, and those with a relative who is known to have such a mutation, should be referred to the National Colorectal Cancer Genetics Centre for formal counselling and mutation analysis.

Surveillance is not required for individuals in a family who do not personally carry the mutation that has been shown to be causative in affected relatives. Hence, a negative gene test from an accredited genetics laboratory in families with characterised mutations means that gastrointestinal surveillance should cease.

All syndromes, except MYH associated polyposis (MAP), are due to germline transmission of a dominant gene defect associated with bowel cancer susceptibility and an excess of other cancer types. Genes responsible for these syndromes have been identified and large numbers of mutations characterized. Because penetrance is incomplete, not all people who carry pathogenic mutations have cancer themselves and some may not have a particularly striking family history. Furthermore, mutations in causative genes have not been identified for all high-risk families. Hence, identification of at-risk individuals may be through family history criteria and/or pathological criteria and/or presence of a pathogenic mutation. MYH associated polyposis is an autosomal recessive disorder, and so there are important issues around cancer risk in relatives and which individuals should be offered surveillance within such families.

Definitions and a detailed evidence-based review of each syndrome may be found at Online Mendelian Inheritance in Man (OMIM), available online through the US National Library of Medicine. (www.ncbi.nlm.mh.gov/sites/entrez). An expert group was established by the Irish National Cancer Control Programme and its recommendations should be read in conjunction with this section.

Hereditary non-polyposis colorectal cancer (HNPCC)

HNPCC can be defined empirically by family history or by demonstration of a pathogenic gene mutation. HNPCC was previously defined using the following criteria: >3 family members affected by colorectal cancer or >2 with CRC and one with endometrial cancer in >2 generations; one affected relative must be age <50 at diagnosis; one of the relatives must be a first degree relative of the other two. Lifetime GI cancer risk associated with HNPCC is variously reported as around 80% for colorectal cancer and 13-20% for gastric cancer in studies that have selected families by HNPCC criteria.

Since the causative DNA mismatch repair (MMR) genes have now been identified, fulfillment of these criteria is not required. Lesser degrees of family history are associated with a lower proportion of cancer cases carrying mutations in one of the known genes. However, an appreciable proportion of early onset colorectal cancer is due to MMR gene mutation. This should be borne in mind when managing young patients with colorectal cancer who do not have an obvious family history, as they may be obligate gene carriers. A web-based model has been developed and validated (http://www1.hgu.mrc.ac.uk/Softdata/MMRpredict.php) that predicts the likelihood that a cancer patient carries a mutation. The algorithm uses age at diagnosis, tumour location and cancer family history to define those who merit tumour immunohistochemical assessment of MMR gene expression and subsequent genetic analysis.

Large bowel surveillance and surgery for HNPCC family members and MMR gene carriers. Total colonic surveillance (at least every two years) should begin at age 25 years, or 5 years younger than the age at diagnosis for the first cancer case in the family, whichever is the earlier. Surveillance should continue to age 75 years or until it has been demonstrated that the individual does not carry the causative mutation.

Any patient with a colorectal malignancy who is a member of a family which is known to carry a mutation in an MMR gene should be counselled and offered a surgical procedure that includes both a cancer control element and prophylaxis. At present there are no data supporting, or against, offering primary prophylactic surgery for patients who do not yet have cancer.

People with MMR gene mutations or those from Amsterdam positive HNPCC families who have cancer will require resectional surgery unless treatment is deemed as palliative. The risk of metachronous colorectal cancer is high. For patients with proximal tumours, colectomy and ileorectal anastomosis facilitates surveillance of the retained rectum. The risk of cancer in the retained rectum is 3% every 3 years for the first 12 years after abdominal colectomy, so endoscopic surveillance of the rectum is mandatory. Surveillance does not completely prevent cancer development, and interval cancers may occur. There are insufficient data to recommend for or against primary prophylactic surgery in MMR gene carriers, so if this considered, it must be on the basis of discussion between a fully informed patient and clinicians. Prophylactic surgery should not be offered to at-risk HNPCC family members who are not proven gene carriers, since the maximum colorectal cancer risk is 40% for males and 15-30% for females.

Some HNPCC families have a particular propensity for gastric cancer. There are no studies of gastric surveillance in HNPCC and no reported observational data. However, it appears reasonable to offer upper GI endoscopy contemporaneously with colonoscopy after the age of 50 years, when the greatest increase in risk occurs. In families with HNPCC where there have been cases of gastric cancer, biennial upper GI endoscopy should commence at age 50 years, or 5 years earlier than the first gastric cancer case in the family, whichever is the earlier. Surveillance should continue to 75yrs or until the causative mutation in that family has been excluded.

Familial adenomatous polyposis (FAP)

Familial adenomatous polyposis (FAP) is an autosomal dominant syndrome with very high penetrance, characterised by the presence of more than 100 adenomatous polyps in the colon and rectum. The

condition is usually due to truncating mutations of the APC gene on chromosome 5q and causative mutations can be identified in ~60% of families. Some APC mutation negative cases are due to MYH mutations. The risk of developing large bowel cancer is >90% by age 70 years without prophylactic surgery, although as more mutations are discovered, it is clear that penetrance is lower than previously thought. The risk of gastroduodenal cancer is ~7%. Around 25% of all cases are due to new (sporadic) mutations and consequently there is no family history in such cases.

In a minority of FAP families a mutation cannot be identified, and so annual flexible sigmoidoscopy should be offered to at-risk family members from age 13-15 years until age 30, and 3-5 yearly thereafter until age 60 years. Surveillance may be offered as a temporary measure for people with documented APC gene mutations who wish to defer prophylactic surgery for personal reasons. Such individuals should be offered 6 monthly flexible sigmoidoscopy and annual colonoscopy, but surgery should be strongly recommended before they reach the age of 25 years. After colectomy and ileorectal anastomosis, the rectum must be kept under review at least annually for life, because the risk of cancer in the retained rectum is 12-29%. The anorectal cuff after restorative proctocolectomy should also be kept under annual review for life. In cases where a mutation is identified, surgery is recommended but some patients may wish to defer surgery. The patient must be counselled about cancer risk and offered intensive surveillance. These recommendations are based on indirect data collected prior to widespread mutation testing. It is clear that large numbers of polyps are associated with high risk of cancer and patients who develop large numbers of polyps early in life should be dissuaded from delaying surgery.

Identification of cases and prophylactic surgery has improved survival in FAP. Patients with proven FAP require surgery to remove the majority of at-risk large bowel epithelium. Because of the significant risk of cancer in the retained rectum, the optimal procedure is proctocolectomy with ileoanal pouch. Patients with FAP should be advised to undergo prophylactic colectomy between the age of 16 and 20 years. The operation of choice is proctocolectomy and ileoanal pouch, but colectomy and ileorectal anastomosis may be appropriate for selected patients with relatively few polyps provided rectal surveillance is undertaken.

To combat the substantial risk of upper GI malignancy in FAP after prophylactic colectomy, upper GI surveillance is recommended. While the presence of gastroduodenal polyposis is well recognised, there are few published studies on which to gauge the potential benefit of surveillance. However, the approach seems reasonable and 3 yearly upper GI endoscopy is recommended from age 30 years with the aim of detecting early curable cancers. Patients with large numbers of duodenal polyps should undergo surveillance yearly.

Peutz-Jeghers Syndrome (PJS)

Peutz-Jeghers Syndrome is a rare autosomal dominant syndrome with high penetrance, defined by the presence of hamartomatous polyps of the small intestine, colon and rectum, in association with mucocutaneous pigmentation. The risk of colorectal cancer is 10-20%. In 20-63% of cases, inactivating mutations can be identified in the gene STK11 (LKB1), but there is evidence for genetic heterogeneity.

Large bowel surveillance by colonoscopy or flexible sigmoidoscopy with barium enema is recommended 3 yearly from age 18 years.

Juvenile Polyposis Syndrome (JPS).

Juvenile polyposis is a rare condition, defined by the presence of multiple hamartomatous polyps of the colon and rectum that develop during childhood. It is associated with a colorectal cancer risk of around 10-38% and a gastric cancer risk of 21%. In around 50% of cases, mutation of the SMAD4 gene is found, but there is some evidence for genetic heterogeneity.

Isolated juvenile polyps are relatively common and do not appear to be associated with excess cancer risk. Because juvenile polyposis is rare, experience is limited. Many polyps are located in the right colon and so the whole colon should be visualised. There is particular risk of malignancy in cases where there is an adenomatous element to the polyps. Hence, polyps should be snared and sent for histology. Consideration should be given to prophylactic surgery in cases with multiple polyps that cannot be controlled by snaring, those with symptoms, those with adenomatous changes, and those where colorectal cancer is a feature of the family history.

Surveillance of the whole of the large bowel by colonoscopy or flexible sigmoidoscopy with double-contrast barium enema is recommended 1 - 2 yearly for individuals believed to have JPS from age 15-18 years, or even younger if the patient has presented with symptoms. Screening intervals could be extended at age 35 years in at-risk individuals, but documented gene carriers or affected cases should be kept under surveillance until age 70 years and prophylactic surgery discussed.

Family History of Colorectal Cancer

People with a family history of colorectal cancer but who do not have a recognisable high risk genetic disorder may still have an increased personal risk of the disease. Colorectal cancer is common, so many people have an affected relative by chance. In various studies, 4-10% of control subjects report at least one affected first degree relative. The greater the number of affected relatives and the younger the age at onset, the greater the personal risk. There are no pathognomonic features of this category of familial clustering of colorectal cancer and so, aside from HNPCC, FAP and other cancer susceptibility syndromes, at-risk groups are currently defined by empiric family history risk criteria. This guidance aims to define the level of empiric risk at which it is appropriate to consider clinical surveillance and specifically excludes people with a family history that fulfils criteria for HNPCC or other autosomal dominant genetic syndrome associated with colorectal cancer susceptibility. Although the aggregate risk of colorectal cancer for groups of people can be defined by family history parameters, it is important to emphasise that the risk is heterogeneous for individuals within such risk categories. Furthermore, some people will develop colorectal cancer who have a family history that does not fulfill these criteria, and it is essential that this residual risk is made explicit.

Risk of colorectal cancer can be estimated empirically from the current age of the at-risk individual, age at onset of affected relatives, and the number and relationship of those affected. While there is an excess risk to people with any affected family member, only those with a first degree relative who has

developed colorectal cancer at a young age, or those with at least two first degree relatives with colorectal cancer, have sufficiently high relative risk to merit consideration for invasive surveillance. It is important to emphasise that the absolute population risk for younger age groups is low, and so even relatively high relative risks do not necessarily reflect high absolute risk, nor do they show that surveillance should be recommended.

The current age of the individual is an important determinant of the absolute risk of colorectal cancer in the next ten years. Risk estimations derived from population data (http://www.isdscotland.org/isd/1425.html) show that people aged 70 years have a 4% chance of developing colorectal cancer in the next 10 years, which is substantially greater than the 10-year risk for people aged 40-60 years with a relative risk (RR) of 5. It is inconsistent to offer intensive surveillance to people with a family history if their absolute risk is less than the population risk for those aged 70 years.

High - Moderate risk

High - moderate risk criteria relate to people who report a family history of three or more first-degree relatives affected by colorectal cancer (none aged <50yrs), where germline transmission to the at-risk individual is possible. People in this category are at sufficient risk to merit low-intensity surveillance between the ages of 55 and 75 years. Individuals who meet high-moderate risk criteria should be offered 5 yearly colonoscopy from age 55 until 75 years if the colon is clear of neoplasia. If polyps are found, they should be removed by snare polypectomy and histologically characterised. Patients with adenomas should have 3 yearly colonoscopy.

Moderate risk

People with only one first degree relative affected by colorectal cancer aged <45yrs, or with only two affected first degree relatives, fulfill criteria for moderate risk. Observational and case/control data indicate a modest excess personal risk. There is some potential benefit of surveillance for people in this group over the age of 55 yrs. Between 4% and 21% of 55-year old people have been reported to have adenomas, but only 2-6% have significant neoplasia. A single colonoscopy at the age of 55 years will both identify any cancers, and permit the removal of polyps. If affected patients are then enrolled on adenoma surveillance programs, colorectal cancer incidence may be expected to fall by 66%. Thus colonoscopy at the age of 55 years for people fulfilling these family history risk criteria may be expected to produce an appreciable reduction in cancer-related mortality. Surveillance before the age of 45 years is not justified, because only 1.6-2% carry a significant adenoma, and the 10 year risk of cancer is less than 1%.

Individuals who meet moderate risk criteria should be offered a single colonoscopy at age 55 years. Any polyps must be snared and histologically characterised. If an adenomatous polyp is confirmed, then adenoma surveillance guidance applies. If the colon is clear of neoplasia, the individual should be reassured and discharged with recommendations relevant to population risk (eg uptake of faecal occult bleed (FOB) screening).

In all cases where surveillance is appropriate, total colonoscopy is to be preferred, because of the risk of proximal colonic lesions and the opportunity for snare polypectomy. When complete colonoscopy cannot be achieved, the patient should be offered a double contrast barium enema or CT colon on the same day. Flexible sigmoidoscopy and barium enema (with targeted follow-up colonoscopy) is an acceptable alternative to colonoscopy.

Low risk

People with family histories that do not fulfill high, high/moderate, or moderate risk criteria are classified as low risk. People at low risk should be reassured. It should be emphasised that their risk level is only marginally greater than that of the wider population, and that they should avail themselves of population-based screening measures.

Referrals made solely on the basis of family history should be audited. This has resource implications, and might be done through the National Genetics Service. Audit should include documentation of family history, level of risk assigned and correlation with outcome measures including: proportion of attendees offered screening, screening-related complications, and long term cancer incidence/mortality in screened and unscreened groups.

Appendix 8

The Faculty of Pathology in Ireland have endorsed the incorporation of the 7th edition TNM (Appendix 8a) changes to the previously endorsed Royal College of Pathologists dataset (which used the 5th edition TNM, Appendix 8b). Each of these documents is reproduced in its entirety.

A newly developed National Quality Assurance Programme in Histopathology commenced in January 2010. A reporting template for colorectal cancer has been agreed by the 8 NCCP-designated cancer centres and has been circulated to all Consultant Histopathologists in Ireland. (Appendix 8c Major Resections for Colorectal Cancer and Appendix 8d Local Excision Specimens) The IACP wishes to extend special thanks to Kieran Sheahan, MB, FRCPI, FRCPath, Associate Clinical Professor, University College Dublin and Consultant Pathologist, St.Vincent's University who participated in the Rectal Cancer Working Group as representative of the Faculty of Pathology in Ireland.

Appendix 8a

7th edition TNM staging system for Colorectal Cancer

American Joint Committee on Cancer TNM staging system publications may be found at http://www.cancerstaging.org/products/ajccproducts.html.

T – Primary tumour

Tx Primary tumour cannot be assessed
T0 No evidence of primary tumour
Tis Carcinoma in situ: intraepithelial or invasion of lamina propria
T1 Tumour invades submucosa
T2 Tumour invades muscularis propria
T3 Tumour invades subserosa or into non-peritonealised pericolic or perirectal tissues
T4 Tumour directly invades other organs or structures and/or perforates visceral peritoneum
T4a Tumour perforates visceral peritoneum
T4b Tumour directly invades other organs or structures[2,3]

Notes:
1: Tis includes cancer cells confined within the glandular basement membrane (intraepithelial) or muscosal lamina propria (intramucosal) with no extension through the muscularis mucosae into the submucosa.
2. Direct invasion in T4b includes invasion of other organs or segments of the colorectum by way of the serosa, as confirmed on microscopic examination, or for tumours in a retroperitoneal or subperitoneal location, direct invasion of other organs or structuresby virtue of extension beyond the muscularis propria.
3.Tumour that is adherent to other organs or structures, microscopically is classified cT4b. However, if no Tumour is present in the adhesion, microscopically, the classification should be PT1-3, depending on the anatomical depth of wall invasion.

N – Regional Lymph Nodes

NX Regional lymph nodes cannot be assessed
NO No regional lymph node metastasis
N1 Metastasis in 1-3 regional lymph nodes
N1a Metastasis in 1 regional lymph node
N1b Metastasis in 2-3 regional lymph nodes
N1c Tumour deposit(s), i.e. satellites*, in the subserosa, or in non-peritonealised pericolic or perirectal soft tissue without regional lymph node metastasis
N2 Metastasis in 4 or more regional lymph nodes
N2a Metastasis in 4-6 regional lymph nodes
N2b Metastasis in 7 or more regional lymph nodes

Note: *Tumour deposits (satellites), i.e. macroscopic or microscopic nests or nodules, in the pericolorectal adipose tissue's lymph drainage area of the primary carcinoma without histological evidence of residual lymph node in the nodule, may represent discontinuous spread, venous invasion with extravascular spread (V1/2) or a totally replaced lymph node (N1/2). If such deposits are observed with lesions that would otherwise be classified as T1 or T2, then the T classification is not changed, but the nodule(s) is recorded as N1c. If a nodule is considered by the pathologist to be a totally replaced lymph node (generally) having a smooth contour), it should be recorded as a positive lymph node and not as a satellite, and each nodule should be counted separately as a lymph node in the final pN determination.

M – Distant Metastasis

MO No distant metastasis
M1 Distant Metastasis
M1a Metastasis confined to one organ (liver, lung, ovary non-regional lymph node(s))
M1b Metastasis in more than one organ or the peritoneum

Appendix 8b

Dataset for Colorectal Cancer (2nd edition), Royal College of Pathologists, September 2007

The Royal College of Pathologists

Pathology: the science behind the cure

Standards and Datasets for Reporting Cancers

Dataset for colorectal cancer (2nd edition)

September 2007

Coordinators: **Professor Geraint T Williams, Cardiff University**
Professor Philip Quirke, Leeds University
Professor Neil A Shepherd, Gloucestershire Royal Hospital

Unique document number	G049
Document name	Dataset for colorectal cancer (2nd edition)
Version number	2
Produced by	Professor Geraint T Williams, Cardiff University, Professor Philip Quirke, Leeds University, and Professor Neil A Shepherd, Gloucestershire Royal Hospital, on behalf of the RCPath Cancer Services Working Group.
Date active	September 2007
Date for review	September 2010
Comments	In accordance with the College's pre-publications policy, this document was put on The Royal College of Pathologists' website for consultation from 2–30 April 2007. Thirty-three pieces of feedback were received and the author considered them and amended the document accordingly. Please email publications@rcpath.org if you wish to see the responses and comments. This edition replaces the 1st edition of the *Dataset for colorectal cancer histopathology reports*, published in 1998. **Professor Carrock Sewell – Director of Publications**

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1 INTRODUCTION

Careful and accurate pathology reporting of colorectal cancer resection specimens is vital because pathology reports are used to:

- confirm the diagnosis
- inform prognosis
- plan the treatment of individual patients
- audit pathology services
- evaluate the quality of other clinical services, notably radiology, surgery and oncology
- collect accurate data for cancer registration and epidemiology
- facilitate high quality research
- plan service delivery.

In colorectal cancer, the key reasons for high-quality pathology reporting include the following.

1. To confirm that radical surgery was necessary and to place the patient in a correct disease stage for an accurate prognosis to be given and appropriate post-operative therapy to be advised.

2. Patients who have lymph node involvement (Dukes C1 and C2 or pN1 and pN2) are likely to receive adjuvant chemotherapy, if age and co-morbidity allow, which is of probable benefit, mildly toxic and costly.[1–4] Those without lymph node metastases but with adverse pathological features (extramural venous invasion, perforation, serosal involvement and incomplete resection) may also be offered adjuvant therapy for small but definite benefit.[2]

3. Patients with rectal adenocarcinoma and involvement of the non-peritonealised (circumferential) resection margin are at high risk of local recurrence[5–7] and may receive post-operative radiotherapy +/– chemotherapy which is toxic and costly but may decrease the likelihood[8,9] of this unpleasant and nearly uniformly fatal complication. The frequency of circumferential margin involvement found may indicate the quality of rectal cancer surgery being performed.[10,11]

4. To determine the effects of pre-operative neoadjuvant therapy.[12]

5. To allow audit of diagnostic and surgical procedures in relation to clinical outcomes avoiding selection bias,[13–14] the identification of good surgical practice[10] and the comparison of patients in clinical trials.

6. To facilitate improvements in the quality of rectal cancer surgery by grading the plane of surgical excision and recording the frequency of abdomino-perineal excisions.[11,15]

Communication of pathology information to the patient and the multidisciplinary team is essential for quality clinical management. Pathologists should attend multidisciplinary team meetings and provide pathology reports that are accurate, complete, understandable, timely and transferable. The use of proformas has been demonstrated to facilitate these requirements[16,17] and their use is strongly recommended, supplemented as necessary by the use of free text.

This dataset has been revised in the light of recent new knowledge to present recommendations on core data items that should be consistently recorded, to provide advice

on how information on these items can best be obtained from the resection specimen, and to include an example template proforma for reporting that is amenable to incorporation within laboratory information management systems. It has been approved by The Royal Colleges of Pathologists, the Association of Coloproctology of Great Britain and Ireland, The NCRI Colorectal Cancer Subcommittee and the Pathology Section of the British Society of Gastroenterology.

2 CHANGES FROM THE FIRST EDITION OF THE DATASET

The main changes in this second edition are the addition of a small number of core data items, the provision of more detailed practical guidance on optimal methods for obtaining the maximum information from a resection specimen, the inclusion of a dataset for reporting local excision specimens and the introduction of standards against which pathologists can audit their practice. The intention is to build further on the major quality improvements that followed the introduction of the original dataset.

Only a small number of additions to the core items for major colorectal cancer resections have been made. These comprise:

1. Measurement of the extent of extramural spread beyond the muscularis propria. There is some evidence to show that this is related to prognosis in rectal cancer[11,18] but the main reason for adding this item is to facilitate audit of preoperative imaging of extramural spread,[13] an increasingly important factor in selecting patients with rectal cancer for neoadjuvant therapy.
2. Recording of tumour involvement of the non-peritonealised resection margin (previously known as the circumferential resection margin) in colonic tumours when this is appropriate, in addition to rectal tumours. This will facilitate the selection of patients with colonic tumours for postoperative adjuvant therapy.[19]
3. Grading of the surgical plane of resection in rectal cancer specimens. Evidence from two large prospective randomised trials[11,15] has demonstrated that this predicts local recurrence and survival. Its continual feedback to multidisciplinary teams may lead to improved quality of surgery and clinical outcomes.[11]
4. Recording of marked or complete tumour regression in patients with rectal cancer that have received preoperative neoadjuvant chemoradiotherapy. There is emerging evidence that this is predictive of outcome when resection margins are clear[12] but there is uncertainty over the best way for it to be assessed. It is therefore recommended that only complete regression or the presence of minimal residual tumour is recorded at present.
5. Recording whether tumour perforation within the specimen (assessed grossly) is serosal (i.e. through the peritoneum with potential contamination of the peritoneal cavity) or retro/infra-peritoneal (with continuity through the tumour between the lumen and the non-peritonealised retroperitoneal or mesorectal resection margin), or both. Serosal perforation indicates pT4b. While retro-or sub-peritoneal perforation may, strictly speaking, represent pT3 (in that there is no overt invasion of an adjacent organ), its prognosis in rectal cancer is similar to that of tumours with serosal perforation. For this reason it is recommended that all forms of perforation, when identified at gross examination, are recorded as pT4.

Since the first edition of this dataset, a revision (the 6th edition) of TNM staging of colorectal cancer has been published.[20] This recommends major changes to the definitions of lymph node involvement that were given in the previous (5th) edition,[21] particularly in relation to the rules governing whether an extramural tumour mass was considered to be a lymph node that had been replaced by tumour. The changes were not evidence-based and cannot be interpreted

reproducibly.[22] For these reasons it is recommended that the criteria used in the 5th edition of TNM are retained for colorectal cancer reporting nationally (although pathologists may choose to provide an additional TNM stage according to 6th edition rules if this is desired locally).

3 AUDIT AND STANDARDS

There is compelling evidence that the introduction of The Royal College of Pathologists' original colorectal cancer dataset (1998) improved the standard of colorectal cancer reporting with regard to the completeness of information within pathology reports.[16,17] However, audits show that significant differences remain in the frequencies with which important adverse prognostic features are found between individual pathologists and multidisciplinary teams.[23,24] When these features are used as the basis for offering adjuvant therapies and giving prognostic information to patients, the extent of the differences is a cause for concern. Most prominent among these are the number of lymph nodes that are examined and the demonstration of serosal involvement and extramural venous invasion. Some of the differences, for example in the number of lymph nodes retrieved from a resection specimen, may be related to factors such as the extent of the resection undertaken or the use of neoadjuvant therapy but it is likely that the way that the pathologist examines the specimen is most important. There is good evidence to show that the prognosis of Dukes B colorectal cancer is directly related to the number of lymph nodes examined pathologically,[25] with the implication that some of these patients are 'understaged' and that if more lymph nodes had been examined metastases would have been found.

It is therefore recommended that multidisciplinary teams and/or pathology departments audit their reports at regular intervals (perhaps yearly) to ensure that their overall results are not significantly different from what might expected. Three standards are recommended for this purpose, namely that in a series of at least 50 resection specimens for symptomatic (i.e. non-screening detected) colorectal cancer.

1. The mean number of lymph nodes examined is 12.
2. The frequency of serosal involvement is at least 20% for colonic cancers and 10% for rectal cancers.
3. The frequency of extramural venous invasion is at least 25%.

We believe there is a reasonable evidence base to suggest that the mean harvest of lymph nodes should be at least 12 but accept that there is less evidence base for the two other outcome measures. Nevertheless, we believe that this is a start at setting such standards and evidence will follow to allow us to adjust these levels in the future.

In order to facilitate this, proposals for the optimum dissection and blocking of resection specimens are given in Section 5, below.

4 CLINICAL INFORMATION REQUIRED ON SPECIMEN REQUEST FORM

While the nature of the resection and the site of the tumour are usually obvious to the pathologist from the specimen that is submitted to the laboratory, it is good practice for him/her to confirm this with the specimen request form. A diagram of the surgical procedure can be extremely valuable in complex specimens.

It is also important for the pathologist to be told:

- the type of tumour if known (with details of the previous biopsy)
- if there is a history of inflammatory bowel disease or familial cancer
- the preoperative stage of the tumour
- whether neoadjuvant therapy has been given; it is particularly important for the pathologist to know the precise site of the tumour when this has apparently led to disappearance of the tumour.

5 SPECIMEN HANDLING AND DISSECTION[26–28]

Specimens should be received fresh and unopened as soon as possible after resection. If submitted outside laboratory hours, they can be refrigerated at 4°C overnight without risk of appreciable autolysis but, if there is likely to be a longer delay before handling, they should be placed unopened in a large volume of formalin-based fixative.

The fresh intact surgical specimen is first inspected to locate the tumour and the presence of any macroscopically obvious perforation through the tumour recorded. The non-peritonealised surgical resection margin (previously known as the radial or circumferential resection margin) in the vicinity of the tumour is then inked or painted with a suitable marker, to enable the subsequent identification of margin involvement. This margin represents the 'bare' area in the connective tissue at the surgical plane of excision that is not covered by a serosal surface. Its extent varies greatly according to the site of the tumour. Low rectal tumours will be completely surrounded by a non-peritonealised margin (the circumferential margin), while upper rectal tumours have a non-peritonealised margin posterolaterally (which is inked) and a peritonealised (serosal) surface anteriorly that should not be inked (Figure 1).

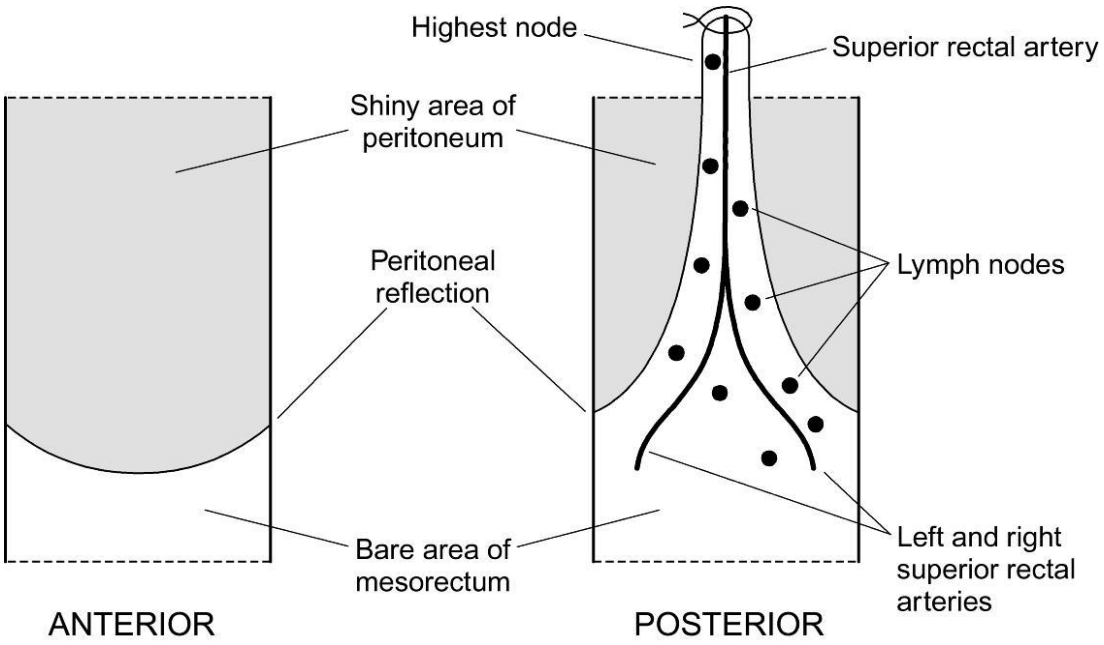


Figure 1 Diagrammatical representation of a resected rectum. Anteriorly the specimen is covered by peritoneum down to the peritoneal reflection and only the unshaded area below this is the non-peritonealised (circumferential) margin that is at risk of tumour involvement. Posteriorly the non-peritonealised margin extends upwards as a triangular-shaped bare area containing the main vessels that continues as the sigmoid mesocolon.

Tumours of the ascending and descending colons will usually also have a non-peritonealised margin posterolaterally (which is inked) and a peritonealised (serosal) surface anteriorly (which is not) (Figure 2). The transverse and proximal sigmoid colons are usually on a narrow mesentery, so tumours here have only a narrow non-peritonealised margin. The peritoneal covering of the caecum is prone to individual variation, so tumours here may have a small or large non-peritonealised area.

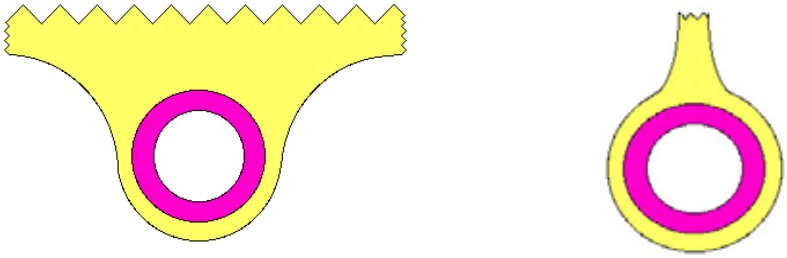


Figure 2 Diagrammatic cross-sections of the ascending colon (left) and sigmoid colon (right). The ascending colon has a broad non-peritonealised (jagged) margin posteriorly while the sigmoid colon is suspended on a narrow mesentery and has a very small non-peritonealised margin.

After inking the margins, many pathologists open the unfixed specimen anteriorly, apart from a segment extending 1–2 cm above and below the tumour, which is left intact to avoid any subsequent confusion over whether the serosal surface or non-peritonealised margin is involved. A foam or absorbent paper 'wick' is then passed through the residual lumen at the tumour site to aid fixative permeation. Some pathologists prefer to open the bowel at the level of the tumour also, especially when the lesion is small, and this is acceptable provided care is taken to ensure that it does not compromise a proper assessment of the key data items, notably involvement of the serosa and the non-peritonealised margin. The opened specimen may be pinned to a cork board and immersed in an adequate volume of formalin. It is recommended that resections should be allowed to fix for at least 48 hours before further dissection and block taking; this facilitates subsequent thin transverse slicing through the tumour and the identification of lymph nodes.[29] Pinned specimens can be removed from the board after 24 hours and allowed to float free so as to avoid the risk of suboptimal fixation of tissue previously adjacent to the cork surface.

After the specimen is fixed, the macroscopic data items (described below) are recorded and the segment of bowel including the tumour, the intestine proximally and distally for some 30mm, and the attached mesentery are sectioned transversely at 3–4mm intervals with a sharp knife to produce slices that include the tumour, the adjacent lymph nodes, and the serosal and non-peritonealised resection margins. It is recommended that these slices be laid out sequentially for photography, enabling a permanent record of the macroscopic appearances to be kept for presentation at the multidisciplinary team meeting if required.

5.1 Tissue sampling

The following blocks of tissue are recommended as a minimum sampling.

- At least four blocks of the tumour to show:
  - the deepest tumour penetration into or through the bowel wall
  - involvement of the serosal surface

  - invasion of extramural veins
  - involvement of any adjacent organs.

- A block to show the closest approximation of tumour to the non-peritonealised resection margin (either in continuity with the main tumour mass or a separate extramural deposit or tumour in a lymph node, whichever is closest). Particular attention should be paid to the anterior margin in rectal cancers, since this is the most common site for non-peritonealised margin involvement.

- If macroscopic tumour is <30mm from the proximal or distal margin, appropriate blocks to show the closest approximation to that margin (including stapling device doughnuts, if they are submitted, and tumour reaches the end margin of the main specimen).

- A block of tumour and the adjacent mucosa.

- A block of normal-appearing background mucosa.

- ALL lymph nodes identified.

- The highest node should be blocked separately.

- Any other macroscopic abnormalities.

Appropriate selection of blocks from the transverse slices is crucial if the maximum amount of information is to be obtained. Serosal involvement is best identified in blocks that are taken from areas that are dulled, fibrotic, or haemorrhagic and is particularly prone to occur where the peritoneum is reflected at an acute angle from the bowel surface on to the adjacent mesentery or in deep crevices or clefts between fat lobules.[30] At least two blocks taken from where the tumour is closest to the serosa are recommended. Extramural venous invasion can sometimes be suspected macroscopically as fine pale lines emanating from the base of the tumour; blocking areas where the base of the tumour has been sectioned tangentially in tumour slices has been shown to improve its recognition.[31]

Rectal tumours that have undergone neoadjuvant therapy may undergo regression such that no definite residual tumour can be recognised. In such cases at least five blocks from the site of the original mass should be taken in the first instance.[12,28] If these do not show residual tumour on microscopic examination (after examining sections from multiple levels) then the whole of the tumour site and/or the scarred area should be blocked for histology.

The identification of lymph nodes should begin with the highest (apical) lymph node. This is the first node identified by sectioning serially and distally from the sutured vascular margin(s), regardless of the actual distance between node and surgical tie (Figure 1); it should be identified and blocked separately. Whereas only one vascular ‘high tie’ is usually present in rectal resections, several vessels might drain colonic resections; if the tumour lies between two major arteries it is appropriate to examine both high tie nodes. The remaining lymph nodes can most easily be identified in the transverse slices of the mesentery, especially if it is sufficiently fixed (see above). Care must be taken to ensure that all of the mesentery between the tumour and the highest lymph node is serially sliced if it has not already been included in the initial slicing. Lymph nodes that are situated very close to a non-peritonealised resection margin should be blocked in such a way as to allow measurement of the distance of any tumour that they may contain from the margin. There is insufficient published evidence to make a firm recommendation as to whether lymph nodes are embedded in their entirety. There is certainly no need to embed multiple slices from a large node that is obviously

involved by tumour macroscopically. Pathologists will need to use their judgement in determining whether every lymph node identified has been adequately sampled.

It is very important to emphasise that **all** of the lymph nodes that can be found in a specimen are examined histologically. The setting of a standard of 12 for the mean number of lymph nodes examined per specimen (see above) in no way means that pathologists should stop searching for lymph nodes once twelve have been identified.

6 CORE DATA ITEMS

6.1 Macroscopic

- Site of tumour.
- Maximum tumour diameter.
- Distance to the nearer end resection margin.
- Tumour perforation.
- Relation of the tumour to the peritoneal reflection (rectal tumours only).
- Grade of the plane of surgical excision (rectal tumours only).
- Distance of the tumour from the dentate line (for abdominoperineal excisions only).

6.2 Microscopic

- Histological type.
- Histological differentiation.
- Maximum extent of local invasion (pT stage) and extramural spread.
- Resection margins (end margins and non-peritonealised margins).
- Lymph node status (number present, number involved, highest lymph node).
- Extramural venous invasion.
- Evidence of significant tumour regression (following neoadjuvant therapy).
- Histologically confirmed distant metastases.
- Background abnormalities.

6.3 Other

- TNM stage (5^{th} edition).
- Dukes stage.
- Completeness of resection.
- SNOMED codes.

7 NON-CORE DATA ITEMS

7.1 Macroscopic

- Specimen dimensions.
- Precise anatomical location of non-peritonealised margin involvement (rectal tumours).
- Quality of the surgical resection plane in abdominoperineal excisions.

7.2 Microscopic

- Separate identification of mucinous tumours.
- Nature of advancing margin (infiltrative *versus* expansive).
- Tumour infiltrating lymphocytes.
- Tumour budding.
- Extramural tumour nodules less than 3mm in diameter.

- Intramural venous invasion.
- Immunohistochemical data.

7.3 Other

- Molecular data.

8 NOTES ON MACROSCOPIC ASSESSMENT

Measurements made on the gross specimen are recorded in millimetres. They are confirmed or amended, where appropriate, by subsequent microscopy.

8.1 Data recorded for all colorectal tumours

8.1.1 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.

8.1.2 Maximum tumour diameter

This is measured from the luminal aspect of the bowel. The thickness of the tumour is ignored for this measurement.

8.1.3 Distance of tumour to nearer cut end

This is the measurement from the nearer **cut end** of the specimen, and not the non-peritonealised or circumferential margin. It is only necessary to examine the margins histologically if tumour extends macroscopically to within 30mm of one of these.[32] 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.

8.1.4 Presence of tumour perforation

Perforation is defined as a macroscopically visible defect through the tumour, such that the bowel lumen is in communication with the external surface of the intact resection specimen. Perforation through the tumour into the peritoneal cavity is a well-established adverse prognostic factor in colonic[19] and rectal cancer and should be recorded. Such cases are always regarded as pT4b in the TNM staging system (see below). Perforation of the proximal bowel as a result of a distal obstructing tumour does not count as tumour perforation.

Localised perforation through the tumour into or through the mesentery, mesorectum or retroperitoneum, unlike serosal perforation, does not automatically denote pT4, and is therefore recorded separately. All such cases will have a positive non-peritonealised resection margin. For reasons discussed above, it is recommended that they staged as pT4.

8.2 Data recorded for rectal tumours only

8.2.1 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 (Figure 3).

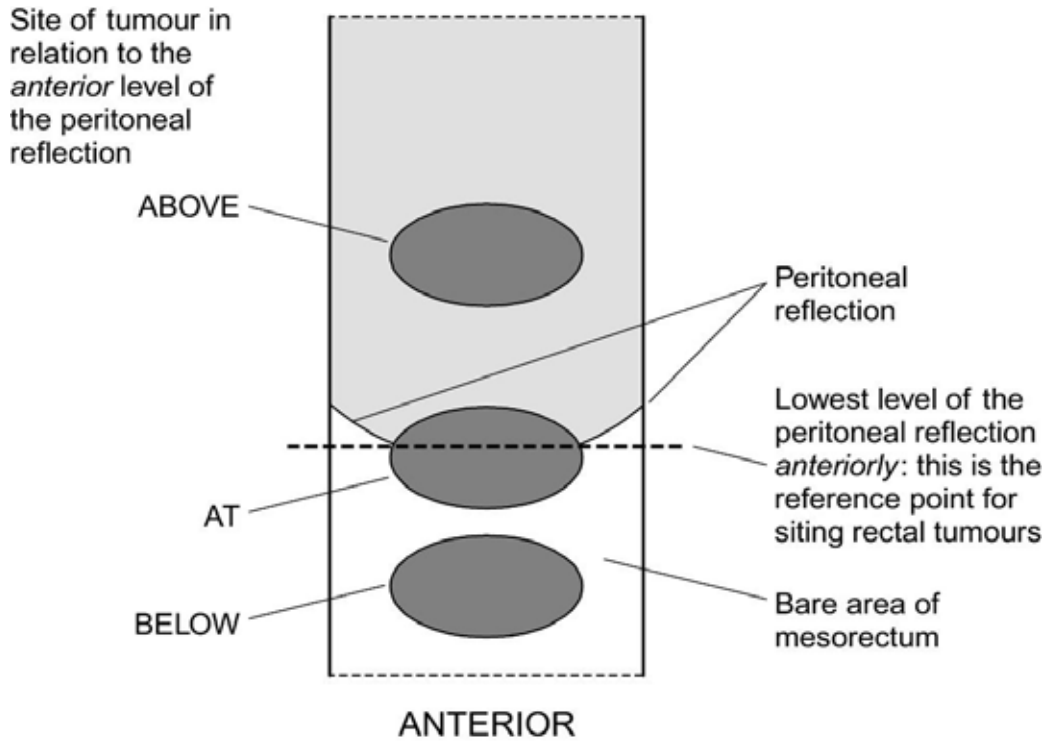


Figure 3 Diagrammatic illustration of rectal tumours in relation to the peritoneal reflection

Rectal tumours are classified according to whether they are:

- entirely above the level of the peritoneal reflection anteriorly
- astride (or at) the level of the peritoneal reflection anteriorly
- entirely below the level of the peritoneal reflection anteriorly.

Tumours below the peritoneal reflection have the highest rates of local recurrence.[11]

8.2.2 Plane of surgical excision

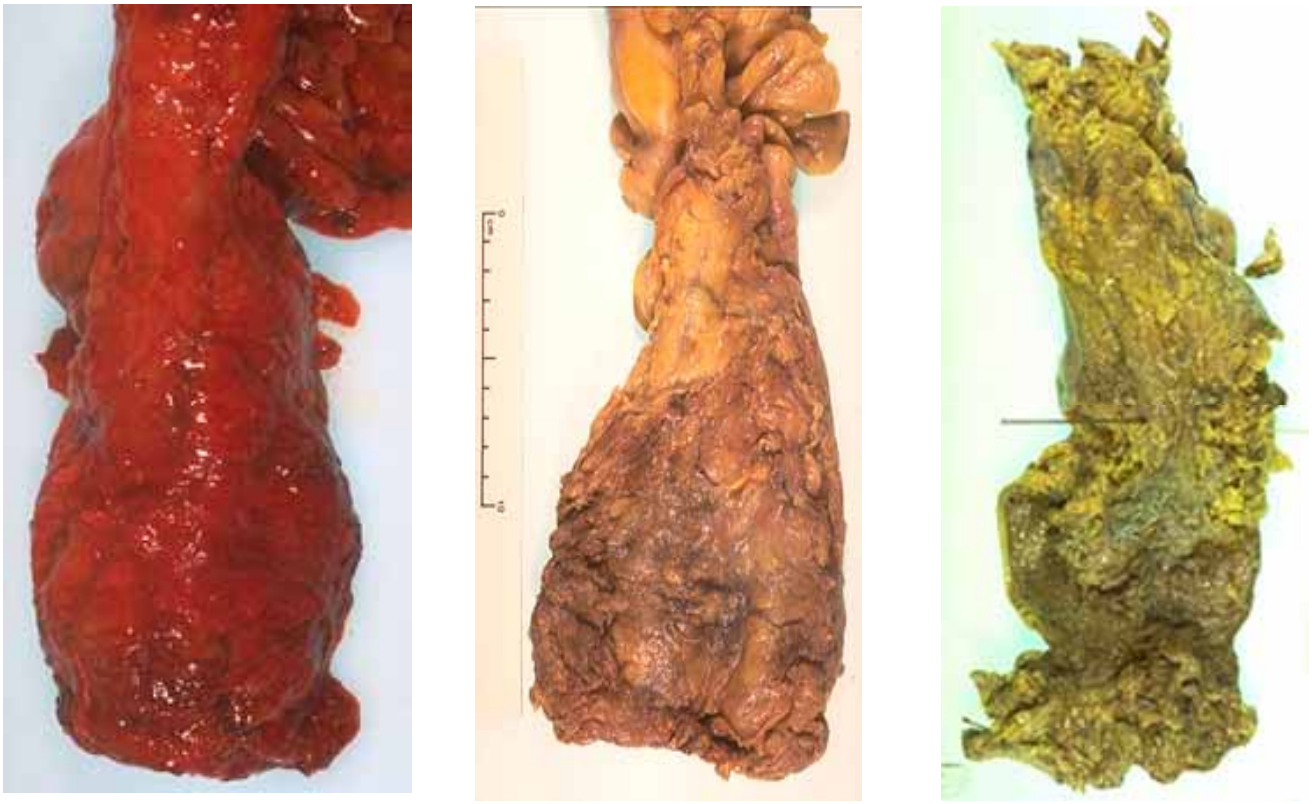
Recently published prospective randomised control trials[11,15] have demonstrated that a macroscopic assessment of the plane of excision of rectal cancers predicts not only margin positivity but also local recurrence and survival. Excision in the mesorectal plane has the best outcome while that extending into the muscularis propria has the worst. The plane of resection can also be used as a marker of the quality of surgery and feedback to the surgical team has been demonstrated to reduce the frequency of resections through the muscularis propria plane with time.[28] Descriptions of the three planes of excision are given below; illustrations of each have been published[28] and examples are shown in Figure 4.

Mesorectal fascial plane

The mesorectal surface is smooth with only minor irregularities of its surface such that no defect is deeper than 5mm. The mesorectum itself is of good bulk anteriorly and posteriorly and there is no ‘coning’ near the tumour.

Intramesorectal plane

The mesorectum is of moderate bulk but the mesorectal surface is irregular. The muscularis propria of the rectal wall is not visible except at the area of insertion of the levator muscles. Moderate coning of the specimen is present distally.



Mesorectal fascia | Intramesorectal | Muscularis propria

Figure 4 Examples of rectal cancer excision specimens showing different surgical excision planes

Muscularis propria plane
There is little bulk to the mesorectum and its surface is irregular with deep cuts and tears, some of which extend on to a visible muscularis propria.

8.2.3 Distance from dentate line

This measurement is only made for low rectal tumours in abdominoperineal excision of rectum (APER) specimens to give an idea of the location of the tumour in relation to the internal sphincter.

9 NOTES ON MICROSCOPIC ASSESSMENT

9.1 Tumour type

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

- adenosquamous carcinomas
- true squamous carcinomas (not including upwardly spreading anal tumours)
- signet ring cell carcinomas
- goblet cell carcinoids and mixed carcinoid-adenocarcinomas
- small cell carcinomas
- totally undifferentiated carcinomas.

Mucinous carcinomas (where >50% of the tumour is composed of extracellular mucin pools) are recorded as adenocarcinomas. Whether they have a different prognosis from conventional adenocarcinomas that is independent of other prognostic factors, or respond differently to certain chemotherapeutic agents, is controversial.[33] There is also some evidence that neoadjuvant therapy may 'induce' a mucinous phenotype.[34] For these reasons their separation cannot be justified as a core item. However, because right sided mucinous adenocarcinomas, and especially those with poor differentiation and prominent tumour-infiltrating lymphocytes, are well recognised to occur in hereditary non-polyposis colorectal cancer (HNPCC), it would be prudent for pathologists to identify such tumours at the multidisciplinary team meeting when they occur in young (<60 years) individuals.

9.2 Differentiation by predominant area

Poorly differentiated carcinomas should be separated from other types but only if this forms the predominant area of the tumour.[35] The criteria for poorly differentiated tumours are **either** irregularly folded, distorted and often small tubules **or** the absence of any tubular formation. 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.

There is considerable recent interest in the phenomenon of tumour budding at the advancing margin of colorectal cancers, with accumulating evidence that it might have prognostic significance.[36] However, this is not yet considered sufficient to justify its inclusion as a core data item.

9.3 Local invasion

The **maximum** degree of local invasion into or through the bowel wall is recorded. This is based on the criteria for pT staging in the TNM staging system (Appendix A). It should be noted that the pT4 stage encompasses either tumour infiltration of an adjacent organ (pT4a) or tumour involvement of the serosal surface (pT4b). Because these two features may have different implications (for instance invasion of a lower rectal tumour into the levators is staged as pT4a but there would be little chance of the same tumour having serosal involvement) and therapeutic connotations they are recorded in separate boxes. Accordingly, pT4 tumours may have either or both the pT4 boxes marked.

Involvement of the serosal (peritoneal) surface is defined as tumour breaching of the serosa with tumour cells visible either on the peritoneal surface or free in the peritoneal cavity.[37] It is important that blocks are taken to optimise recognition of this feature (see above) and that further sections are cut from blocks whose initial sections show tumour cells that are close to the surface or localised peritoneal inflammation, erosion or mesothelial hyperplasia. Serosal involvement through direct continuity with the primary tumour (pT4b) is recorded differently from peritoneal tumour deposits that are separate from the primary that are regarded as distant metastases (pM1). It is very important to appreciate the difference between involvement of the serosal surface and involvement of a non-peritonealised (sometimes referred to as 'circumferential') surgical resection margin, which is recorded separately. The first is a risk factor for intraperitoneal metastasis while the latter is a risk factor for local recurrence.

TNM conventions[38] recommend that direct invasion of an adjacent organ by way of the serosa is always recorded as pT4 while intramural (longitudinal) extension into an adjacent part of the bowel (e.g. extension of a caecal tumour into the terminal ileum or of a rectal cancer into the anal canal) does not affect the pT stage. Extramural extension of a rectal cancer into the skeletal muscle of the external sphincter, levator ani, and/or puborectalis is classified as pT4a.

The conventions also state that tumour entirely within vessels does not qualify as local spread in pT staging.

The **maximum distance of tumour spread beyond the bowel wall** is recorded in millimetres from the outer margin of the muscularis propria, as illustrated in Figure 5. When the tumour has obliterated the muscularis propria focally, the contour of the outer aspect of the adjacent muscularis should be used to make this measurement. For pT1 and pT2 tumours this will be zero.

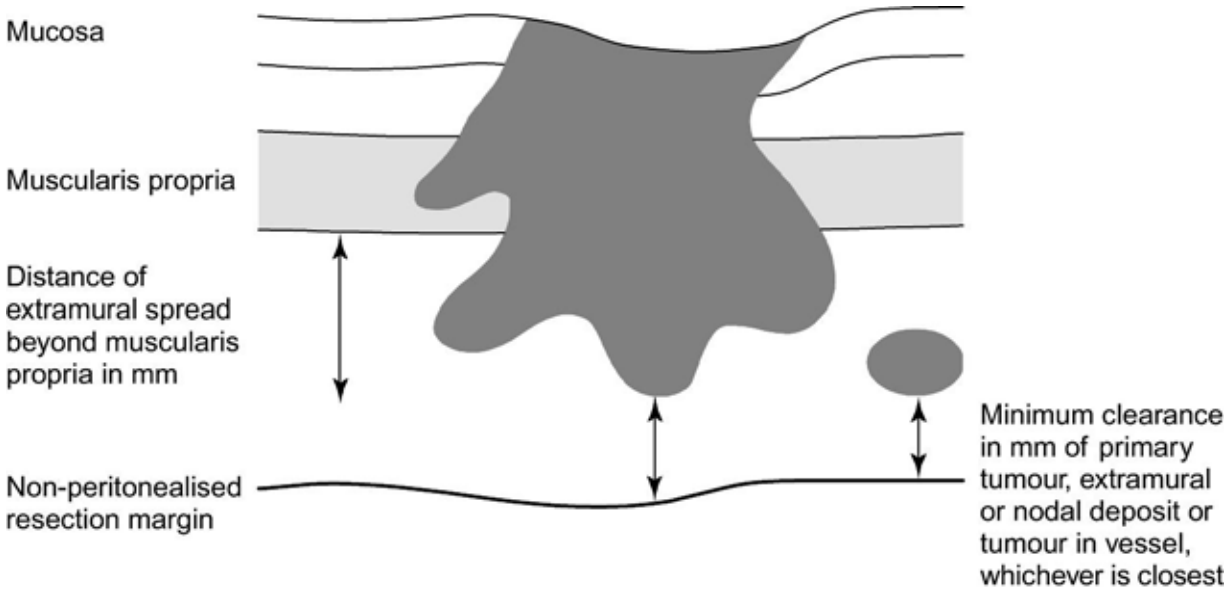


Figure 5 Measuring extramural spread and clearance of tumour from the non-peritonealised margin

9.4 Response to neoadjuvant therapy

There is preliminary evidence that completely excised rectal carcinomas that have received pre-operative neoadjuvant chemoradiotherapy that has resulted in complete or marked regression have a better prognosis than those without significant regression.[12] However, there is no consensus over how lesser degrees of regression are estimated histologically. While this evidence alone may not be sufficient to warrant recording of response to therapy as a core data item, the fact that it is also regularly sought by oncologists at multidisciplinary team meetings has led to the recommendation that the most obvious degrees of regression are documented.

Accordingly, the following categories are included:

- no residual tumour cells and/or mucus lakes only
- minimal residual tumour, i.e. only occasional microscopic tumour foci are identified with difficulty
- no marked regression.

For tumour staging following neoadjuvant therapy, only the presence of tumour cells in the surgical specimen is taken to determine the stage. Fibrosis, haemorrhage, necrosis, inflammation and acellular mucus are ignored. Cases with complete regression are therefore recorded as pT0 (or more precisely ypT0 – see Section 10).

9.5 Resection margins

9.5.1 Doughnuts

It is not necessary to examine doughnuts from stapling devices histologically if the main tumour is >30mm from the cut end of the main specimen[32] or in other rare cases described above. If doughnuts are not sectioned or if no doughnuts are submitted for examination, this item should be recorded as not applicable.

9.5.2 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.

9.5.3 Non-peritonealised ('circumferential') resection margin

This margin has been defined in detail above. Its involvement is predictive of local recurrence and poor survival in rectal tumours[5–7] and in those that have not received neoadjuvant therapy it may be an indication for postoperative adjuvant therapy. The importance of non-peritonealised margin involvement in colonic tumours, particularly those of the caecum and ascending colon, has been recognised more recently.[19,39,40] Spread of the tumour into a pericolic abscess cavity that communicates with a non-peritonealised resection margin has also been associated with a poor prognosis in one study, although the number of cases in this category was small.[19] The evidence to recommend equating this with margin-positivity is not yet sufficient, but if this finding is present in a resection specimen it would be prudent to highlight the observation in the pathology report and to bring it to the attention of the multidisciplinary team.

The minimum distance between the tumour and the circumferential margin in millimetres is also recorded from the histological slides (see Figure 5). If this is $\leq$1mm then the circumferential margin is **regarded as involved** in the assessment of completeness of resection later on 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. One study has suggested that the <1mm definition of an involved non-peritonealised margin should be increased to 2mm for rectal tumours.[41] This issue will be kept under review.

9.6 Metastatic spread

9.6.1 Lymph nodes

All of the lymph nodes that have been retrieved from the specimen should be examined histologically as described above. Multiple or serial sections from lymph node blocks are not recommended for routine reporting; neither is the use of immunohistochemistry or molecular techniques because there is insufficient evidence on the prognostic significance of tumour deposits identified in this way. Extracapsular invasion is not recorded specifically. Lymph nodes are distinguished from extramural lymphoid aggregates by the presence of a peripheral sinus.

Extramural deposits of tumour that have no lymph node structure are regarded as lymph node deposits that have completely effaced the original lymph node if they measure $\geq$3mm in diameter, according to the recommendations of the 5th edition of the TNM classification.[21] Smaller deposits are regarded as apparent discontinuous extensions of the main tumour. Any tumour involvement of a lymph node, no matter how small, identified in haematoxylin and eosin stained sections is regarded as significant.

pN1 corresponds to involvement of 1–3 nodes and pN2 to involvement of four or more nodes.

9.6.2 Highest node positive

For proper Dukes staging the pathologist will need to identify separately the highest lymph node closest to the main vascular tie(s). This is not defined by any measure of distance, but is simply the first node identified by slicing the mesentery serially and distally from each main vascular tie.

9.6.3 Extramural venous 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. It is also strongly suspected when a rounded or elongated tumour profile that is not in direct continuity with the advancing tumour margin is identified in the extramural tissues adjacent to an artery, especially when no separate accompanying vein can be identified. Sections taken at multiple levels and elastin stains should be used to confirm or refute venous invasion in suspicious cases. The selection of tumour blocks to optimise the identification of venous invasion[31] (see above) is encouraged.

The prognostic significance of extramural venous invasion is well established.[42] Some studies have also found independent prognostic significance for involvement of submucosal veins,[19] while others have not. Only extramural venous involvement is recommended for recording at present.

9.6.4 Histologically confirmed distant metastases

The presence of histologically confirmed distant metastases, and their site, is recorded. It should be noted that disease classifiable as distant metastasis may sometimes be present within the primary tumour resection specimen, for example a serosal or mesenteric deposit that is distant from the primary mass. 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 also regarded as distant metastases (pM1).[38]

9.7 Background abnormalities

The presence of any pathological abnormalities in the background bowel should be recorded. The following are particularly of note:

- adenoma(s), including their number
- synchronous carcinoma(s) (each of which will require a separate proforma)
- ulcerative colitis
- Crohn’s disease
- familial adenomatous polyposis
- diverticulosis.

10 PATHOLOGICAL STAGING

10.1 Complete resection at all margins

This includes the ends of the specimen, the non-peritonealised resection margin and the doughnuts. Tumours that are completely excised are classified as R0, those with microscopic (but not macroscopic) margin involvement are classified as R1 and those with macroscopic margin involvement as R2.

When doughnuts and the ends of the specimen are not examined histologically because the tumour is >30mm away these are assumed to be tumour-free.

Non-peritonealised margins are regarded as involved if tumour extends histologically to ≤1mm from this margin. Such cases should be recorded as R1.

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

10.2 TNM staging

The TNM staging definitions are shown in Appendix A. The prefix 'p' is used to indicate pathological staging. If neoadjuvant preoperative chemotherapy or radiotherapy has been given, the prefix 'yp' should be used to indicate that the original p stage may have been modified by therapy. Accordingly, when there has been complete regression of the tumour, the TNM stage is ypT0, ypN0, ypMX

The following points are worth restating.

i In determining the pT stage, tumours that have perforated into the peritoneal cavity are regarded as pT4b, irrespective of other factors.

ii Direct **intramural** spread of caecal carcinomas into the terminal ileum or rectal cancers into the anal canal 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 <3mm in diameter but as lymph nodes if they measure ≥3mm in diameter.

iv The difference between stage 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 **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 (clinical) 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 are regarded as distant metastases.

10.3 Dukes classification

The Dukes and Bussey modification of the original Dukes classification of resection specimens is recommended:

Dukes A:	Tumour limited to the wall of the bowel, lymph nodes negative
Dukes B:	Tumour spread beyond muscularis propria, lymph nodes negative
Dukes C1:	Lymph nodes positive but highest node spared
Dukes C2:	Highest lymph node involved.

11 SNOMED CODING

Colorectal carcinomas should be coded according to the SNOMED system (see Appendix B).

12 REPORTING OF LOCAL EXCISION SPECIMENS OF COLORECTAL CANCER

Local excision of colorectal cancer is usually undertaken in one of two situations:

- as a curative procedure for early (T1) colorectal cancer
- as a palliative procedure in debilitated patients.

While the principles of pathological reporting are the same as in major resections, a number of features require special attention in local excisions of (presumed) early cancers with curative intent because they are used to determine the necessity for more radical surgery. In addition to the assessment of completeness of excision, these include the recording of parameters that predict the presence of lymph node metastasis in early tumours, namely tumour size, poor differentiation, the depth of invasion into the submucosa and the presence of submucosal lymphovascular invasion.[43–50] However, there is only limited consensus in the published literature on how exactly some of these parameters should be assessed, especially the depth of submucosal invasion.

Local excisions are undertaken endoscopically or, in the case of early rectal tumours, under direct vision. The majority of such tumours arise within pre-existing adenomas that may be polypoid, sessile or flat, and the best pathological information is derived when lesions are excised in their entirety to include both the invasive and preinvasive components.[26] Polypoid lesions on a narrow stalk can be fixed intact, while sessile lesions should be pinned out, mucosal surface upwards, on a small piece of cork or other suitable material, taking pains to identify the narrow rim of surrounding normal tissue, before fixing intact. Piecemeal removal of tumours, entirely acceptable for palliative resections, should be avoided because it precludes a reliable assessment of completeness of excision.

After fixation, polypoid lesions may be bisected through the stalk if they measure <10mm; larger polyps are trimmed to leave a central section containing the intact stalk, and all fragments embedded for histology. It is recommended that at least three sections are taken from blocks containing the stalk. The margins of larger, sessile lesions should be identified with appropriate coloured markers (inks or gelatine) and the whole of the specimen transversely sectioned into 3mm slices and submitted for histology in sequentially labelled cassettes. In cases where the margin of normal tissue is less than 3mm, a 10mm slice containing the relevant margin should be made and further sectioned at right angles.[26]

An example template proforma for reporting local excision specimens is included in this dataset (Appendix D). The core data items to be recorded are:

- Specimen type, whether a polypectomy, an endoscopic mucosal resection or a transanal endoscopic microsurgical (TEM) excision
- Tumour site
- Maximum tumour diameter in millimetres
- Histological type
- Histological differentiation
- Extent of local invasion
- Lymphovascular invasion
- The presence of a background adenoma
- Margin involvement
- The minimum clearance of the invasive carcinoma (in millimetres)
- A pT stage (it is inappropriate to use Dukes classification because this requires assessment of the nodal status)

Some of these require special consideration.

12.1 Histological differentiation

Although poor differentiation is identified by the same criteria as in major resection specimens, it is unclear from the literature whether this should be based on the predominant area or the worst area. Publications containing recommendations for selecting patients with T1 tumours for major colorectal resection do not comment on the issue, but it is likely that most have used the worst area. In view of this uncertainty it is recommended that poor differentiation (including signet ring cell adenocarcinoma) should be based on the worst area until the situation is clarified by further research; this approach will ensure that patients are not exposed to the possibility of under-treatment.

12.2 Extent of local excision

Tumours that invade the muscularis propria usually require further surgery. The frequency of lymph node metastasis in sessile tumours that involve the superficial, middle, and deep thirds of the submucosa (so-called Kikuchi levels sm1, sm2 and sm3 respectively)[47] has been reported to be 2%, 8% and 23%[48] (Figure 6).

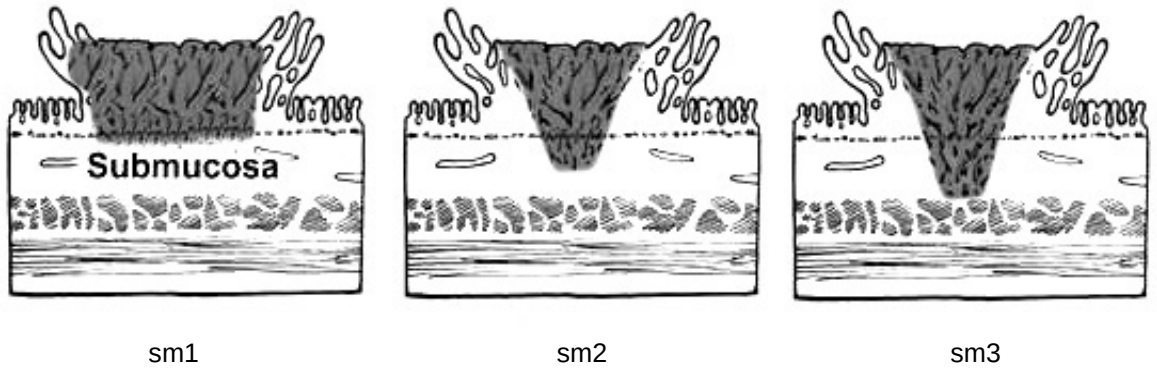


Figure 6 Kikuchi levels of submucosal infiltration[48]

(From Figure 1 of Nascimbeni R, Burgart LJ, Nivatvongs S, Larson DR. 'Risk of lymph node metastasis in T1 carcinoma of the colon and rectum'. *Diseases of the Colon & Rectum* 2002; 45:200–206. Copyright: Springer Science and Business Media Reproduced with kind permission from Springer Science and Business Media)

In polypoid lesions, Haggitt *et al*[46] identified the level of invasion into the stalk of the polyp as being important in predicting outcome and found that 'level 4' invasion, in which tumour extended beyond the stalk of the polyp into the submucosa but did not invade the muscularis propria, was an adverse factor (Figure 7).

However, neither Kikuchi (for sessile tumours) nor Haggitt (for polypoid tumours) systems are always easy to use in practice, especially if there is fragmentation or suboptimal orientation of the tissue, and one study found lymph node metastases in 6/24 Haggitt level 3 lesions.[50] More recently Ueno et al[50] have proposed that of the absolute thickness of the invasive tumour (beyond the muscularis mucosae) provides a more objective measure. In view of the uncertainty and lack of consensus, a firm recommendation for one method of assessing local invasion cannot be made, and all three approaches are included on the template proforma for local multidisciplinary teams to select which they consider to be most appropriate.

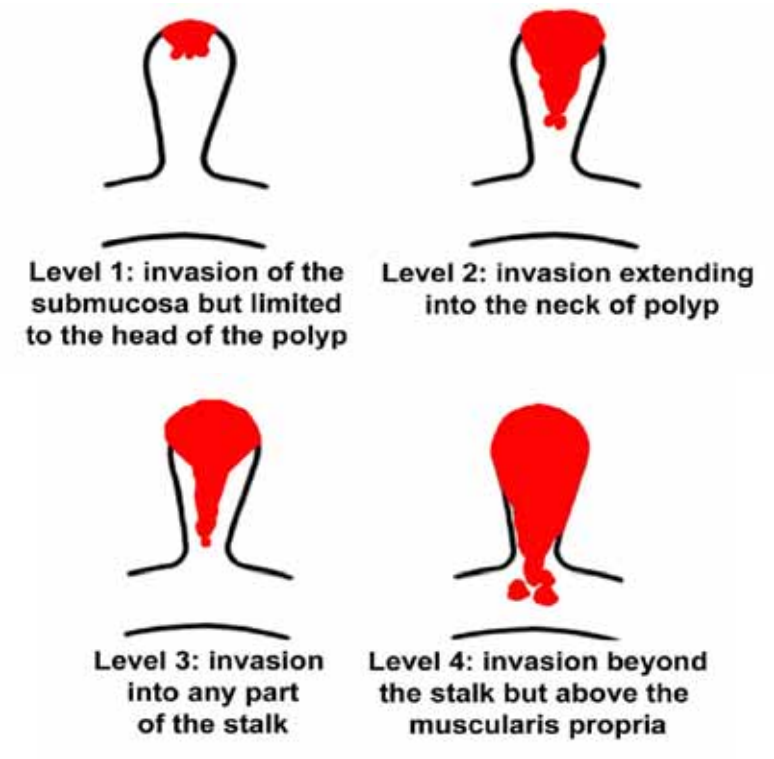


Figure 7 Haggitt levels of invasion in polypoid carcinomas[49]

(From: Mainprize KS, Mortensen NJM, Warren BF. 'Early colorectal cancer: recognition, classification and treatment'. *Br J Surg* 1998;85:469–476. Copyright: British Journal of Surgery Society Ltd. Reproduced with kind permission from John Wiley & Sons Ltd, on behalf of the BJSS Ltd).

12.3 Lymphovascular invasion

Definite invasion of endothelium-lined vascular spaces in the submucosa is generally regarded as a significant risk for lymph node or distant metastasis. Sometimes retraction artefact around tumour aggregates can make assessment uncertain, in which case this uncertainty should be recorded and the observation interpreted by the multidisciplinary team in the light of any other adverse histological features.

12.3.1 Margin involvement

It is important to record whether the deep (intramural) resection margin is involved by invasive tumour (which may be an indication for further surgery) and whether the mucosal resection margin is involved by carcinoma or the pre-existing adenoma (in which case a further local excision may be attempted).

There has been considerable discussion and controversy in the literature over what degree of clearance might be regarded as acceptable in tumours that extend close to the deep submucosal margin. It is important that this is measured and recorded in the report. It is likely that most would regard a clearance of <1mm as an indication for further therapy. Some would use <2mm and a few <5mm.

There is also emerging evidence that identification of the phenomenon of tumour budding may be of prognostic importance in predicting outcome following local excisions.[50] While this is not yet considered to be sufficient to warrant inclusion as a core data item, local multidisciplinary teams may wish to receive this information if they will use it in a therapeutic decision-making process.

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APPENDIX A TNM CLASSIFICATION OF COLORECTAL TUMOURS [21]

pT	**Primary tumour**
pTX	Primary tumour cannot be assessed
pT0	No evidence of primary tumour
pT1	Tumour invades submucosa
pT2	Tumour invades muscularis propria
pT3	Tumour invades through muscularis propria into subserosa or non-peritonealised pericolic or perirectal tissues
pT4	Tumour directly invades other organs (pT4a) and/or involves the visceral peritoneum (pT4b)

pN	**Regional lymph nodes**
pNX	Regional lymph nodes cannot be assessed
pN0	No regional lymph node metastasis
pN1	Metastasis in 1 to 3 regional lymph nodes
pN2	Metastasis in 4 or more regional lymph nodes

pM	**Distant metastasis**
pMX	Distant metastasis cannot be assessed
pM0	No distant metastasis
pM1	Distant metastasis

APPENDIX B SNOMED CODES OF COLORECTAL TUMOURS

T codes

T-66000	Appendix
T-67000	Colon
T-68000	Rectum

M codes

M-81400	Adenoma
M-74000	Dysplasia
M-80103	Carcinoma
M-81403	Adenocarcinoma
M-84803	Mucinous adenocarcinoma
M-84903	Signet ring cell adenocarcinoma
M-85603	Adenosquamous carcinoma
M-80703	Squamous cell carcinoma
M-80413	Small cell carcinoma
M-80203	Undifferentiated carcinoma
M-82433	Goblet cell carcinoid tumour
M-82443	Mixed carcinoid-adenocarcinoma

Appendix 8c

Proforma for colorectal cancer specimens

REPORTING TEMPLATE FOR COLORECTAL CANCER REPORTS

Surname: ..... Forenames: ..... Date of Birth: .....

Sex: ..... Case ID: ..... Hospital: .....

Pathologist: ..... Surgeon: .....

Instructions: If completing form by hand, fill in blank spaces & circle required text as appropriate. If completing form online, fill in blank spaces & delete non-required text as appropriate. Optional data fields are denoted with ¢, all other data fields are required.

Specimen type: Total colectomy / Right hemicolectomy / Left hemicolectomy / Sigmoid colectomy / Anterior resection / Abdominoperineal excision / Other (specify) ……....

Macroscopy:

Site of tumour: ……..... Maximum tumour diameter: ……..... mm

Distance of tumour to nearer cut end ……..... mm Tumour perforation (pT4): Yes / No

If yes, perforation is: serosal / retro / infra peritoneal

For rectal tumours,

relation of tumour to peritoneal reflection: Above / Astride / Below

Plane of surgical excision: Mesorectal fascia / Intramesorectal / Muscularis propria

For abdominoperineal resection specimens: Distance of tumour from dentate line: ..... mm

Microscopy:

Histology:

Type : Adenocarcinoma: Yes / No If No, specify type: .....

Differentiation by predominant area: Well / Moderate / Poor

Local Invasion:	No carcinoma identified (pT0):	Yes / No
	Submucosa (pT1):	Yes / No
	Muscularis propria (pT2):	Yes / No
	Beyond muscularis propria (pT3):	Yes / No
	Perforates visceral peritoneum (pT4a) :	Yes / No
	Directly invades other organs or structures (pT4b):	Yes / No

Maximum distance of spread beyond muscularis propria: ……..... mm

Neoadjuvant therapy given: Yes / No

If Yes, circle as appropriate: No residual tumour cells, mucus lakes only (TRG 1)

Minimal residual tumour/fibrosis outgrows tumour (TRG 2)

No marked regression/tumour outgrows fibrosis (TRG 3)

Tumour involvement of margins:

Doughnuts: Yes / No / Not Applicable Margin (cut end): Yes / No / Not Applicable

Non-peritonealised 'circumferential' margin: Yes / No / Not Applicable

Histological measurement from tumour to non-peritonealised margin: ..... mm

Metastatic spread:

No of lymph nodes present: .....

No of involved lymph nodes:	Metastasis in 1 regional LN (N1a):	Yes / No
	Metastasis in 2-3 regional LNs (N1b):	Yes / No
	Tumour deposit(s), i.e., satellites, in the subserosa, or in non-peritonealized pericolic or perirectal soft tissue *without* lymph node metastasis (N1c):	Yes / No
	Metastasis in 4-6 regional LNs (N2a):	Yes / No
	Metastasis in 7 or more regional LNs: (N2b)	Yes / No
	Extramural venous invasion:	Yes / No
Distant metastases:	No distant metastases:	Yes / No
	Microscopically confirmed metastases confined to one organ (M1a):	Yes / No
	Microscopically confirmed metastases in more than one organ or the peritoneum (M1b):	Yes / No

Background abnormalities: Yes / No

If yes: No of Adenomas: .....

Type of Adenoma(circle appropriate):

Familial adenomatous polyposis / Ulcerative colitis/ Crohn's disease / Diverticulosis / Synchronous carcinoma(s) (complete a separate form for each cancer) / Other: .....

Pathological Staging:

Complete resection at all surgical margins: Yes (R0) / No (R1 or R2)

UICC, TNM Classification 7th Edition: pT …….. N …….. M …….. (*Delete pM if unknown*)
(y for neoadjuvant cases)

Dukes Stage: .....

Appendix 8d

Proforma for local excision specimens

REPORTING TEMPLATE FOR LOCAL EXCISION SPECIMENS

Surname: ..... Forenames: ..... Date of Birth: .....

Sex: ..... Case ID: ..... Hospital: .....

Pathologist: ..... Surgeon: .....

Instructions: If completing form by hand, fill in blank spaces & circle required text as appropriate. If completing form online, fill in blank spaces & delete non-required text as appropriate. Optional data fields are denoted with ¢, all other data fields are required.

Specimen type:

Polypectomy /Endoscopic mucosal resection /Transanal endoscopic microsurgical(TEM) excision / Other

Comments: .....

Macroscopy:

Site of Tumour: ……..... Maximum tumour diameter(if known): …..... mm

Microscopy:

Histology:

Type : Adenocarcinoma: Yes / No If No, specify type: .....

Differentiation: Well to Moderate / Poor

Local Invasion:	No carcinoma identified (pT0):	Yes / No
	Submucosa (pT1):	Yes / No
	Muscularis propria (pT2):	Yes / No
	Beyond muscularis propria (pT3):	Yes / No
	Perforates visceral peritoneum (pT4a) :	Yes / No
	Directly invades other organs or structures (pT4b):	Yes / No

For pT1 tumours, Maximum thickness of invasive tumour from muscularis mucosa ..... mm

Haggitt level (polypoid tumours): 1 / 2 / 3 / 4 Kikuchi level (for sessile/flat tumours): sm1 / sm2 / sm3

Lymphatic or vascular invasion: None / Possible / Definite

Background adenoma: Yes / No

Margins (circle as appropriate): Not involved / Involved by adenoma only / Deep margin involved by carcinoma / Peripheral margin involved by carcinoma

Histological measurement from carcinoma to nearest deep excision margin: ..... mm

Pathological Staging:

Complete resection at all surgical margins: Yes (R0) / No (R1 or R2)

UICC, TNM Classification 7th Edition: pT …….. N …….. M …….. (*Delete pM if unknown*)
(y for neoadjuvant cases)

Handling and Cut-up Guidelines:

Please refer to Royal College of Pathologists Dataset for Colorectal Cancer (2nd Edition) for assistance in completing the above dataset. This document presents recommendations on specimen handling, notes on macroscopic and microscopic assessment, pathological staging and reporting. The Faculty Colorectal Cancer review group has advised the use of the 7th edition TNM; therefore the current dataset has been updated to reflect these changes.

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1. Royal College of Pathologists Dataset for Colorectal Cancer (2nd Edition) September 2007

2. TNM Classification of Malignant Tumours, 7th Edition 2010

3 AJCC Cancer Staging Manual, 7th edition. Springer, 2010.

Appendix 9

Proforma for operation notes for colorectal cancer surgery

Colorectal cancer operation note

Any operation note must provide sufficient information to allow a clear understanding of the operative findings, the procedure carried out and the personnel involved. The essential requirements are contained in the Royal College of Surgeons' Guidelines for Clinicians on Medical Records and Notes (RCS, 1990), but in colorectal cancer, there is specific information which is important both for audit purposes and for planning further treatment (NBOCAP report 2005 Ib).

A suggested proforma for a colorectal cancer operation note

Surname _____ Forenames _____ Date of Birth_____

Hospital No_____ Consultant _____ Hospital _____

Ward _____

Surgeon_____ Anaesthetist _____

Date of Operation _____

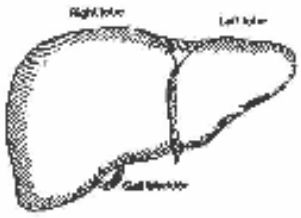
Time Start _____ Time End_____

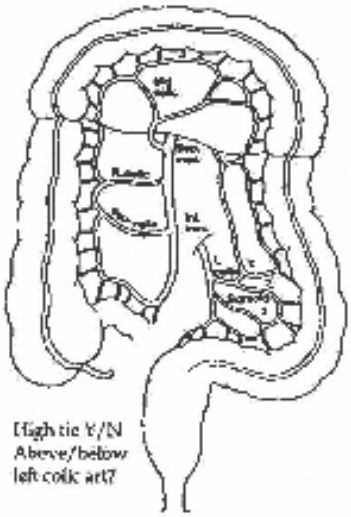
Operation Title

Curative / palliative / uncertain, due to liver / local extension / other_____

Elective / Emergency due to perforation / obstructed / bleeding

ASA grade I / II / III / IV / V (see over for definition)





Splenic flexure mobilised ☐ Y ☐ N

Tumour is mobile / tethered / fixed to _____

Presence of abscess / perforation / ascites No_____

Blood transfused _____ units

Stoma ☐ Y ☐ N ileostomy / colostomy : temporary / permanent

Operative Severity

☐ Minor	Gastroscopy, wedge excision nail	☐ Complex Major D	Elective aortic aneurysm (AAA)
☐ Intermediate	Ingunial hernia, excision of breast lump	☐ Complex Major C	Anterior resection of rectum
☐ Major	Cholecystectomy, partial thyroidectomy	☐ Complex Major B	Ruptured AAA, oesophagogastrectomy
☐ Major +	Parotidectomy, colonic resection	☐ Complex Major A	Cardiac surgery entailing bypass

Multiple procedures

- ☐ 1
- ☐ 2
- ☐ >2

Blood loss

- ☐ <= 100ml
- ☐ 101-500 ml
- ☐ 501-999 ml
- ☐ >=1000 mls

Presence of Malignancy

- ☐ None
- ☐ Primary only
- ☐ Nodal metasases
- ☐ Distant metastases

Peritoneal Soiling

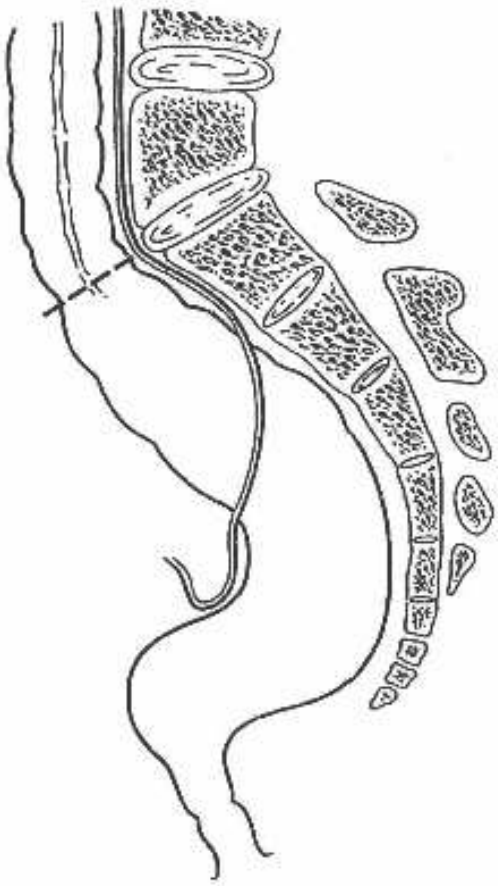
- ☐ None
- ☐ Minor (serious fluid)
- ☐ Local pus
- ☐ Free bowel contents, bile or pus

Mode of Surgery

- ☐ Elective
- ☐ Urgent (requiring surgery within 24 hours of admission, at least 2 hrs available for resuscitation - even if this period was not used
- ☐ Emergency (requiring surgery within 2 hrs of admission)

Colorectal cancer operation note proforma continued

For rectal and distal sigmoid tumours



Height of tumour	_____ cm
Anastomosis to anal verge	_____ cm
Distal irrigation	☐ Y ☐ N
TME / PME ? (estimate of % age)	_____ %
Distance of lesion to distal cut margin	_____ cm
Distance to dentate line (if AP resection)	_____ cm

ASA Grade Definitions

Grade I:	Fit and well
Grade II:	Mild systemic disease (including smoking, obesity, treated hypertension); not necessarily the cancer
Grade III:	Disease which restricts activity
Grade IV:	Life threatening disease
Grade V:	Not expected to survive for 24 hours

NB In an emergency situation, the suffix E is added to the ASA grade. In general, the risk attached is equivalent to the next group lower, i.e. IE equates to II, IIE equates to III etc.

Appendix 10

IACP Rectal Cancer Follow up Guidelines

The rationale of surveillance of patients who have surgery for rectal cancer is to identify metastatic disease or local recurrence at an early stage when curative treatment may be possible. The optimum surveillance protocol is controversial and a randomised trial is currently in progress. These guidelines may be altered when more robust clinical data is available. Surveillance is only rational when the individual patient is likely to undergo treatment of asymptomatic disease if it is discovered. Patients with severe medical co-morbidity, those who are unsuitable for adjuvant chemotherapy or patients unfit for liver or lung resection may not derive benefit from surveillance while experiencing the anxiety associated with regular tests. A decision about the appropriateness of surveillance must be made for each patient. Patients with early rectal cancer, polyp cancers, locally resected rectal cancers or unoperated rectal cancers treated by radiotherapy alone may require modified surveillance. The optimum surveillance of the latter group in particular is currently unknown.

In patients who undergo curative resection for colorectal cancer, in whom surveillance is deemed appropriate by the surgeon and their patient, the following minimum surveillance protocol is proposed:

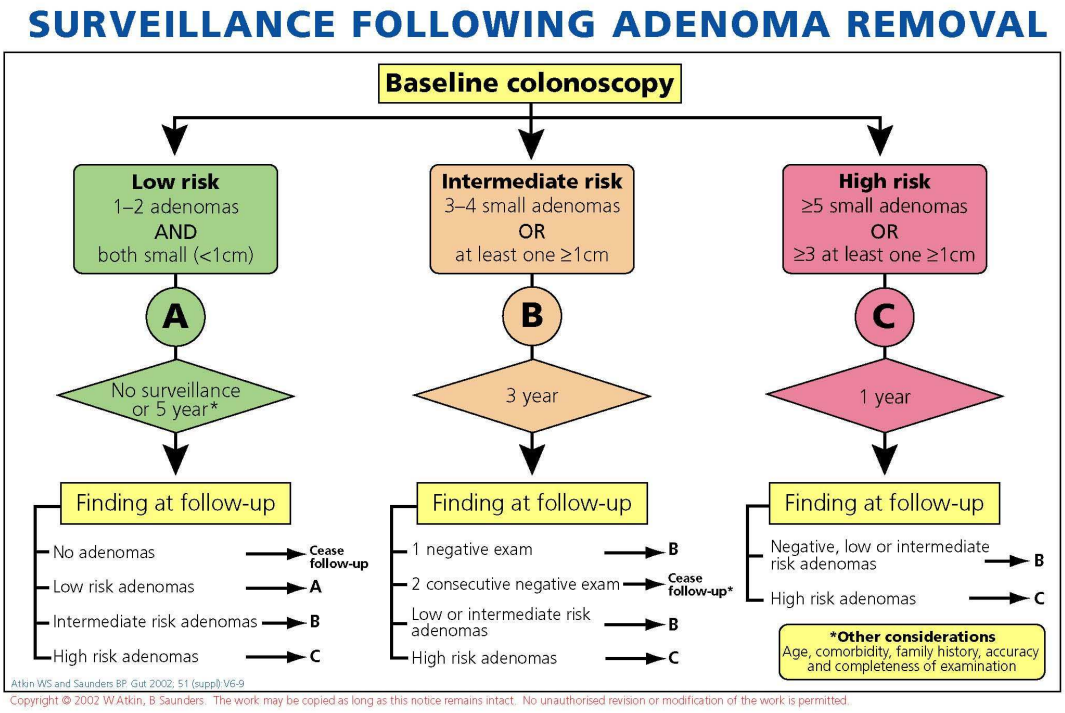
> CT thorax, abdomen, pelvis with po and iv contrast every 6 months for two years then annually for three further years.
>
> Colonoscopy at diagnosis (or as soon as practicable afterwards) and again at 5 years post-operatively. If adenomatous polyps are found, polyp surveillance should be performed in accordance with BSG guidelines (Appendix 11).

Patients with a genetic diagnosis increasing their risk of colorectal or other cancers may require more intensive follow-up including other investigations (Appendix 7).

It should be noted that while traditional teaching indicates that recurrence generally occurs within 5 years of resection, the increased use of adjuvant therapy has the potential to delay recurrence outside of that time frame. The optimum termination point for surveillance is currently unclear. In the US, cancer survivorship programmes are widespread, allowing surveillance and other health promoting activities take place synchronously.

Appendix 11

British Society of Gastroenterology Polyp Surveillance Guidelines



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