This costing report accompanies the clinical guideline: ‘Colorectal cancer: the diagnosis and management of colorectal cancer’ (available online at www.nice.org.uk/guidance/CG131).

**Issue date:** November 2011

---

**This guidance is written in the following context**

This report represents the view of NICE, which was arrived at after careful consideration of the available data and through consulting with healthcare professionals. It should be read in conjunction with the NICE guideline. The report and template are implementation tools and focus on those areas that were considered to have a significant impact on national resource utilisation.

Assumptions used in the report are based on assessment of the national average. Local practice may be different from this, and the impact should be estimated locally.

Implementation of the guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement this guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in the costing assessment should be interpreted in a way that would be inconsistent with compliance with those duties.

---

**National Institute for Health and Clinical Excellence**

MidCity Place  
71 High Holborn  
London WC1V 6NA

www.nice.org.uk

© National Institute for Health and Clinical Excellence, November 2011. All rights reserved. This material may be freely reproduced for educational and not-for-profit purposes. No reproduction by or for commercial organisations, or for commercial purposes, is allowed without the express written permission of NICE.
Contents

Executive summary ........................................................................................................4
  Supporting implementation .....................................................................................4
  Potential resource-impact recommendations ........................................................4
  Net resource impact ...............................................................................................5
  Local costing template ..........................................................................................6

1 Introduction .............................................................................................................7
  1.1 Supporting implementation ...........................................................................7
  1.2 What is the aim of this report? .....................................................................7
  1.3 Epidemiology of colorectal cancer ................................................................7
  1.4 Current service provision .............................................................................8

2 Costing methodology ............................................................................................9
  2.1 Process ...........................................................................................................9
  2.2 Scope of the cost-impact analysis .................................................................9

3 Analysis of the potential resource impact ..........................................................10
  3.1 Diagnostic investigations ............................................................................10
  3.2 Adjuvant chemotherapy for high-risk stage II colon cancer ....... 14
  3.3 Imaging for metastases ............................................................................17
  3.4 Chemotherapy for advanced and metastatic colorectal cancer .. 21

4 Impact of guidance for commissioners ...............................................................24

5 Conclusion ............................................................................................................25

Appendix A. Approach to costing guidelines ..........................................................27
Executive summary

This costing report looks at the resource impact of implementing the NICE guideline ‘Colorectal cancer: the diagnosis and management of colorectal cancer’ in England.

The costing method adopted is outlined in appendix A; it uses the most accurate data available, was produced in conjunction with key clinicians, and reviewed by clinical and financial professionals.

Supporting implementation

The NICE clinical guideline on ‘Colorectal cancer’ is supported by a range of implementation tools available on our website www.nice.org.uk/guidance/CG131 and detailed in the main body of this report.

Potential resource-impact recommendations

Because of insufficient data and variation in current practice, it is not possible to quantify the national cost impact of implementing the guidance. This report discusses the potential costs and savings that need to be considered at a local level.

This report focuses on the recommendations that are likely to have the greatest resource impact and therefore require the most additional resources to implement or can potentially generate the biggest savings if changes are needed at a local level. They are:

- **Diagnostic investigations** – offer colonoscopy to patients without major comorbidity, to confirm a diagnosis of colorectal cancer. Offer flexible sigmoidoscopy then barium enema for patients with major comorbidity. Consider computed tomographic (CT) colonography as an alternative to colonoscopy or flexible sigmoidoscopy then barium enema, if the local radiology service can demonstrate competency in this technique.

- **Adjuvant chemotherapy for patients with high-risk stage II colon cancer** – consider adjuvant chemotherapy after surgery for patients with high-risk stage II colon cancer.
- **Imaging for suspected metastases** – the use of MRI and PET-CT scanning for patients being assessed for metastatic colorectal cancer should be decided by the multidisciplinary team, based on the location of suspected metastases from the results of the initial CT scan.

- **Chemotherapy for advanced and metastatic colorectal cancer** – the guideline makes recommendations on the most cost-effective multiple chemotherapy regimens.

**Net resource impact**

Colonoscopy is viewed as the gold standard in confirming colorectal cancer. It is known to have high sensitivity and specificity for detection of cancer, pre-malignant adenomas and other symptomatic colonic diseases. The guidance suggests that colonoscopy should be used as the preferred test to establish a confirmed diagnosis of colorectal cancer in patients without major comorbidities. We do not anticipate that this recommendation will result in an increase in demand for colonoscopy services nationally, but it is difficult to determine what current practice is around the country and there may be variation. According to expert clinical opinion, currently CT colonography is only being used for a small number of patients. Its usage may, however, increase in the future. In the majority of cases where a suspicious lesion is found, it is likely that a colonoscopy would be carried out to obtain biopsy proof of diagnosis. In these cases the cost of the CT scan will be additional. If cancer is not suspected then there may be a saving as a result of avoiding a colonoscopy.

According to expert clinical opinion, the recommendation to give adjuvant chemotherapy to patients with high-risk stage II colon cancer may represent a change in practice, although there is variation around the country. If adjuvant chemotherapy is not given to this subgroup as part of current practice, there could be additional costs of up to £36 million per year nationally if all patients were given the most expensive regimen. Offering adjuvant chemotherapy may prevent some patients progressing to advanced disease, resulting in savings.
According to expert clinical opinion, the type and quantity of imaging carried out to look for metastases varies around the country. Any increase in the use of magnetic resonance imaging (MRI) and positron emission tomography-computed tomographic (PET-CT) scans may mean that additional investment will be needed. If MRI and PET-CT scans are used more in future practice there are potential savings through reducing the number of operations that are started but not completed on discovery that the cancer is too widespread for a successful outcome.

Three multiple chemotherapy regimens were found to be the most cost effective in the health economic modelling. There are potential savings locally where the recommended chemotherapy regimens are not part of standard care. However, as all three combinations include fluorouracil, patients who are intolerant to fluorouracil will need to be given an alternative regimen at a higher cost. Raltitrexed is recommended as a treatment option for these patients. If raltitrexed is already being used as part of current practice, then it is not anticipated that there will be a cost impact. If alternative regimens are being used, the cost impact will need to be calculated locally.

**Local costing template**

The costing template produced to support this guideline enables organisations in England, Wales and Northern Ireland to estimate the impact locally.
1 Introduction

1.1 Supporting implementation

1.1.1 The NICE clinical guideline on colorectal cancer is supported by the following implementation tools available on our website www.nice.org.uk/guidance/CG131:

- costing tools
  - a national costing report; this document
  - a local costing template; a simple spreadsheet that can be used to estimate the local cost of implementation
- a slide set; key messages for local discussion
- case studies; example cases designed to improve and assess the user’s knowledge of the guidance
- clinical audit tools; to measure current practice against the guidance recommendations and identify areas in which practice can be improved.

1.2 What is the aim of this report?

1.2.1 This report aims to help organisations plan for the financial implications of implementing NICE guidance.

1.2.2 This report does not reproduce the NICE guideline on colorectal cancer and should be read in conjunction with it (see www.nice.org.uk/guidance/CG131).

1.2.3 The costing template that accompanies this report is designed to help those assessing the resource impact at a local level in England, Wales or Northern Ireland.

1.3 Epidemiology of colorectal cancer

1.3.1 Colorectal cancer is the third most common cancer in the UK after breast and lung cancer. Colorectal cancer includes cancerous growths in the colon, rectum and appendix. In 2009 there were
33,604\(^1\) new cases of colorectal cancer registered in England; around two-thirds (21,225) in the colon (ICD-10 code C18) and one-third (12,379) in the rectum (ICD-10 codes C19-21). The occurrence of large bowel cancer is strongly related to age, with 83% of cases arising in people who are 60 years or older. It is anticipated that as our older population increases, the number of cases of colorectal cancer will increase.

1.4 **Current service provision**

1.4.1 If cancer is suspected, patients are referred by their GP to secondary care. More complicated cases may be referred on to a tertiary care cancer centre.

1.4.2 Flexible sigmoidoscopies are likely to be performed in endoscopy clinics by a nurse specialist in line with local protocol. Colonoscopies are performed by nurse endoscopists, consultant surgeons and gasterenterologists. CT colongraphies are likely to be carried out in the radiology department by a consultant radiologist.

1.4.3 Imaging for metastases, using CT and MRI will be performed in most local hospitals. PET-CT is performed by a limited number of providers and access is via agreed national and network clinical criteria. Local colorectal cancer multidisciplinary teams generally start with CT imaging for metastatic disease, followed by MRI for a proportion of patients with suspected hepatic metastases (those for whom the diagnosis is uncertain, or for whom liver resection is thought to be feasible). Network hepatobiliary multidisciplinary teams then tend to require PET-CT for any patient being considered for hepatic resection, and may refer patients back to their local hospital for MRI of the liver if this has not already been performed. The most cost-effective imaging pathway for suspected hepatic metastases is not known.

---

2 Costing methodology

2.1 Process

2.1.1 We use a structured approach for costing clinical guidelines (see appendix A).

2.1.2 The costing template includes indicative unit costs. Users should talk to clinicians locally to estimate local practice and how it might change following publication of the guideline.

2.1.3 Costs are based on the Payment by Results tariff where possible or the average cost per the National Schedule of Reference Costs if more appropriate. These figures are based on the average cost of all the procedures in that grouping. Feedback suggests that for more complex procedures, the cost to the provider may not always be fully reimbursed. In these instances commissioners and providers may want to work together to negotiate prices locally.

2.2 Scope of the cost-impact analysis

2.2.1 The guideline offers best practice advice on the care of adults who are suspected of having, or are diagnosed with, colorectal cancer.

2.2.2 The guidance does not cover:

a) Patients with anal cancer.

b) Children (younger than 18 years) with colorectal cancer.

c) Patients with primary or secondary lymphoma of the colon and rectum.

d) Patients with pure small cell carcinoma of the colon and rectum.

e) Patients with carcinoid tumours of the colon and rectum.

f) Patients with high grade neuroendocrine tumours of the colon and rectum.

g) Patients with adenocarcinoma with some neuroendocrine differentiation.
h) Patients with gastrointestinal stromal tumours (GIST) or sarcoma of the colon and rectum.

Therefore, these issues are outside the scope of the costing work.

2.2.3 Rather than costing each individual recommendation, costing work has focused on the areas that will potentially need the most resources to implement or generate the biggest savings at a local level. These areas were determined in discussion with the clinical guideline project team and the members of the guideline development group.

3 Analysis of the potential resource impact

3.1 Diagnostic investigations

Recommendations

3.1.1 Offer colonoscopy to patients without major comorbidity, to confirm a diagnosis of colorectal cancer. If a lesion suspicious of cancer is detected, perform a biopsy to obtain histological proof of diagnosis, unless it is contraindicated (for example, patients with a blood clotting disorder). [Recommendation 1.1.1.2]

3.1.2 Offer flexible sigmoidoscopy then barium enema for patients with major comorbidity. If a lesion suspicious of cancer is detected perform a biopsy unless it is contraindicated. [Recommendation 1.1.1.3]

3.1.3 Consider computed tomographic (CT) colonography as an alternative to colonoscopy or flexible sigmoidoscopy then barium enema, if the local radiology service can demonstrate competency in this technique. If a lesion suspicious of cancer is detected on CT colonography, offer a colonoscopy with biopsy to confirm the diagnosis, unless it is contraindicated. [Recommendation 1.1.1.4]
Background

3.1.4 In 2009, 33,604 people were diagnosed with colorectal cancer in England\(^2\). Expert opinion suggests that as fewer than 10% of patients referred to NHS outpatient clinics on suspicion of symptomatic colorectal cancer are diagnosed with the condition (see the full guideline\(^3\)), then an estimated minimum of 336,000 people may require a diagnostic investigation each year.

3.1.5 Historically, a number of different interventions have been used to diagnose colorectal cancer, often guided by local expertise and preference. These interventions are colonoscopy; flexible sigmoidoscopy then barium enema; and CT colonography.

3.1.6 Colonoscopy has for many years been regarded as the reference standard for diagnosing colonic disease. Patients with serious cardiorespiratory or neurological comorbidity may be at high risk from potential complications of colonoscopy (for example colonic perforation or effects of sedation). Such patients might be better served by alternative investigations.

3.1.7 Many centres offer patients a combined investigative pathway of flexible sigmoidoscopy (endoscopic examination of the distal large bowel) followed by barium enema. Barium enema is a long-established radiological investigation of the colon and rectum. This investigative route allows biopsy of lesions detected during flexible sigmoidoscopy.

3.1.8 Computerised tomographic colonography is a more recent radiological investigation in which cross-sectional images of the abdomen and pelvis are obtained following laxative preparation and insufflation of the large bowel with air or carbon dioxide. The images are then analysed using two-dimensional and three-


\(^3\) National Collaborating Centre for Cancer (2011) Colorectal cancer: the diagnosis and management of colorectal cancer.
dimensional image reconstruction techniques. Colonoscopy can be performed at a later date to obtain biopsy confirmation of suspected tumours.

3.1.9 Colonoscopy is used to examine the whole colon, which makes it a good test for diagnosing colorectal cancer. Flexible sigmoidoscopy only looks at the bottom half of the colon and therefore has a lower specificity. Flexible sigmoidoscopy is commonly used as a triage test for people with mild to moderate symptoms. As the test takes less time to perform than colonoscopy it is a good way of initially excluding people who have a less serious condition.

3.1.10 CT colonography can also be used to examine the whole colon. There is currently variation in the use of CT colonography and not all localities have the skills and resources required to use this investigational technique. According to expert clinical opinion, currently CT colonography is only being used for a small number of patients; however its usage may increase in the future.

3.1.11 The guidance suggests that colonoscopy should be used as the preferred test to establish a confirmed diagnosis of colorectal cancer in patients without major comorbidities. We do not anticipate that this recommendation will result in an increase in demand for colonoscopy services nationally, however it is difficult to determine what current practice is around the country and there may be regional variation.

Potential costs

3.1.12 The costing template that accompanies this report can be used to help estimate whether there will be a local cost impact after implementation of the guidance.
3.1.13 Currently the ‘Payment by results’ tariff for both colonoscopy and flexible sigmoidoscopy is £398\(^4\). A local increase in the number of colonoscopies undertaken would not result in an incremental cost for commissioners initially, although there may be resource implications for the provider around staff costs and clinic time. A coding change in the 2009/10 version of reference costs (£577 for colonoscopy compared with £462 for a flexible sigmoidoscopy) indicates that from 2012/13 the tariff will better reflect the difference in cost.

3.1.14 The average cost of a computerised tomography scan is estimated to range from £100 to £172\(^5\). There is no specific national cost for computerised tomography colonography and it is unclear where it sits within this range.

3.1.15 According to expert clinical opinion, in the majority of cases where a suspicious lesion is found, it is likely that a colonoscopy would be carried out to obtain biopsy proof of diagnosis. In these cases the cost of the CT scan will be additional. If cancer is not suspected then a colonoscopy at £398 would be avoided.

3.1.16 Any increase in the pressure on CT scanning services may mean that additional investment will be needed where local capacity cannot absorb incremental activity. The cost of a CT scanner is estimated at £579,000, with an estimated lifespan of 7 to 10 years\(^6\). There will also be annual maintenance costs. Where funding for capital investment is not available, additional CT scanners could be leased or the activity contracted out to other providers.

\(^4\) ‘Payment by results’ (2011/12) Elective tariff for admitted patient care and outpatient procedures: FZ26A endoscopic or intermediate large intestine procedures 19 years and over.
\(^5\) National Schedule of Reference Costs (2009/10): RA08Z-RA14Z Computerised Tomography Scan.
3.2  Adjuvant chemotherapy for high-risk stage II colon cancer

Recommendation

3.2.1 Consider adjuvant chemotherapy after surgery for patients with high-risk stage II colon cancer. Fully discuss the risks and benefits with the patient. [Recommendation 1.2.6.1]

Background

3.2.2 The benefit of adjuvant chemotherapy for stage III colorectal cancer patients has been confirmed and treatment schedules refined in the intervening years. It is recognised that, overall, patients with stage II disease have a better prognosis than those with stage III disease, but that outcomes for patients within stage II vary and that there is a spectrum of risk for recurrence. There are several pathological features that have been shown to be associated with poor prognosis in stage II disease, such as extramural vascular invasion, pT4 disease (serosal breach or perforation), poorly differentiated tumours, obstructed tumours, perineural invasion and low lymph node recovery from the resection specimen. These features have been used to identify ‘high-risk’ patients. Adjuvant chemotherapy is not considered to be part of current practice for this subgroup of patients, although there is variation around the country.

3.2.3 There is a risk that following a successful resection, there may already be undetectable changes elsewhere in the body that will result in the cancer spreading following surgery. Giving adjuvant chemotherapy should either stop or delay the spread of disease.

3.2.4 In 2009, 21,225 people were registered with a malignant neoplasm of the colon. Approximately 30% of patients (6368) present with

---

stage II colon cancer and expert clinical opinion estimates that up to 50% (3184) of these could be high-risk. However, as there is no standard definition for ‘high-risk’ it is difficult to identify these patients. (There is however a list of prognostic factors which are used to identify potentially high-risk patients including extramural vascular invasion, grade 3/poor differentiation, T4 stage/perforation, perineural invasion, obstructive tumours, mucinous tumours, microsatellite instability and tumour budding.)

3.2.5 According to expert clinical opinion, this recommendation is likely to represent a change in practice for this subgroup of patients, although there is variation around the country.

Potential costs

3.2.6 Chemotherapy regimens which may be given are summarised in table 1.
### Table 1 Indicative adjuvant chemotherapy regimens for patients with high-risk stage II colon cancer

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Dosage</th>
<th>Cycles/weeks</th>
<th>Drug cost(^a) (£)</th>
<th>Administration cost(^b) (£)</th>
<th>Total cost per patient (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capecitabine</td>
<td>1250 mg/m(^2) twice daily for 14 days</td>
<td>8</td>
<td>2602</td>
<td>1371</td>
<td>3974</td>
</tr>
<tr>
<td>Fluorouracil plus folinic acid (de Gramont)</td>
<td>1000 mg/m(^2) for 2 days, 200 mg/m(^2) for 2 days</td>
<td>12</td>
<td>3454</td>
<td>5282</td>
<td>8736</td>
</tr>
<tr>
<td>Fluorouracil plus folinic acid (weekly FUFA)</td>
<td>370 mg/m(^2) and 25 mg/m(^2) for 1 day</td>
<td>30</td>
<td>549</td>
<td>6554</td>
<td>7103</td>
</tr>
<tr>
<td>Capecitabine and oxaliplatin (XELOX)</td>
<td>1000 mg/m(^2) twice daily for 14 days, 130 mg/m(^2) for 1 day</td>
<td>8</td>
<td>8623</td>
<td>1891</td>
<td>10,514</td>
</tr>
<tr>
<td>Folinic acid, fluorouracil and oxaliplatin (FOLFOX)</td>
<td>350 mg for 1 day, 2400 mg/m(^2) and 400 mg/m(^2) for 1 day, 85 mg/m(^2) for 1 day</td>
<td>12</td>
<td>8723</td>
<td>2738</td>
<td>11,461</td>
</tr>
</tbody>
</table>

\(^a\) The drug costs have been taken from British National Formulary 62. It has been assumed that there will be no wastage due to a high volume of patients.

\(^b\) The administration costs have been calculated using the National Schedule of Reference Costs 2009–10, chemotherapy delivery: outpatient.

3.2.7 If there are approximately 3125 patients with high risk stage II colon cancer in England, and adjuvant chemotherapy is not given to this

---

\(^9\) The regimens and dosages used are indicative and provided for costing purposes only. Practice is likely to vary between providers, please enter local assumptions on the costing template which accompanies this report.
subgroup as part of current practice, there could be additional costs for adjuvant chemotherapy of up to £36 million per year if everybody were eligible for treatment and received the most expensive regimen. The actual cost will need to be assessed on a local basis.

3.2.8 The costing template that accompanies this report can be used to estimate the incremental cost for commissioners based on local circumstances.

Potential savings

3.2.9 Offering adjuvant chemotherapy may prevent some patients progressing to advanced disease, avoiding or delaying further treatment costs. This has the potential to result in savings.

3.2.10 It has not been possible to estimate the number of people this would apply to.

3.3 Imaging for metastases

Recommendations

3.3.1 Imaging extra hepatic metastases

- Offer contrast-enhanced CT of the chest, abdomen and pelvis to patients being assessed for metastatic colorectal cancer.
- If intracranial disease is suspected, offer contrast-enhanced MRI of the brain. Do not offer imaging of the head, neck and limbs unless involvement of these sites is suspected clinically.
- Discuss all imaging with the patient following review by the appropriate anatomical site-specific MDT.
- If the CT scan shows the patient may have extra-hepatic metastases that could be amenable to further radical surgery, an anatomical site-specific MDT should decide whether a positron emission tomography-CT (PET-CT) scan of the whole body is appropriate.
• If contrast-enhanced CT suggests disease in the pelvis, offer an MRI of the pelvis and discuss in the colorectal cancer MDT.
• If the diagnosis of extra-hepatic recurrence remains uncertain, keep the patient under clinical review and offer repeat imaging at intervals agreed between the healthcare professional and the patient. [Recommendations 1.3.3.1 to 1.3.3.6]

3.3.2 Imaging hepatic metastases

• If the CT scan shows metastatic disease only in the liver and the patient has no contraindications to further treatment, a specialist hepatobiliary MDT should decide if further imaging to confirm surgery is suitable for the patient – or potentially suitable after further treatment – is needed. [Recommendation 1.3.2.1]

Background

3.3.3 According to expert clinical opinion current practice is variable. Colorectal cancer that has metastasised to the liver may be amenable to surgical resection with long-term survival improvement or curative intent. Currently, greater than 20% of patients with hepatic colorectal cancer metastases can be considered candidates for hepatectomy with curative intent.

3.3.4 Imaging plays three roles in patient selection:

• to detect as many liver metastases as possible and their location, in order to maximise the chance of achieving complete clearance of disease at the time of surgery
• to accurately characterise any benign liver lesions that may be present, so as to avoid unnecessary surgical procedures
• to detect other sites of metastatic disease that may themselves be amenable to treatment, or may render liver resection inappropriate.

3.3.5 According to expert opinion, there is now evidence that contrast-enhanced liver MRI using a “liver-specific” contrast agent is slightly
more sensitive and substantially more specific than CT for
detection and characterisation of liver metastases. PET-CT is more
sensitive than liver MRI for assessing the “whole body” burden of
metastatic disease, as it encompasses the entire torso, while a liver
MRI scans only the upper abdomen.

3.3.6 It is important that appropriate scanning is carried out in order to
identify the extent of the metastases so that an informed decision
can be made on whether or not to operate. Hepatic resection is a
costly procedure with significant morbidity; careful patient selection
is crucial to achieve the best clinical outcomes.

3.3.7 According to expert opinion, currently each cancer network has at
least one PET-CT scanner. Some centres have more than one
scanner but most or all of the extra capacity is earmarked for
research or non-cancer applications. Because of the large
geographical areas covered by cancer networks, it may be difficult
for all patients to gain access.

3.3.8 The most common site for metastatic spread is the liver. Other
sites, e.g. lungs, brain and bone, are unusual in the absence of
liver metastases. Approximately 20–25% of patients have
clinically detectable liver metastases at the time of the initial
diagnosis and a further 40–50% of patients develop liver
metastases within 3 years of primary surgery. In 2009, 33,604
people were diagnosed with colorectal cancer. Therefore on
average approximately 22,683 (7561 plus 15,122) people will
develop liver metastases each year.

---

Potential costs

3.3.9 An increase in the use of MRI and PET-CT scans in addition to CT scans will result in incremental costs for the commissioner. Table 2 shows the cost of each type of imaging technique.

<table>
<thead>
<tr>
<th>Type of scan</th>
<th>Unit cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT(^a)</td>
<td>172</td>
</tr>
<tr>
<td>MRI(^b)</td>
<td>284</td>
</tr>
<tr>
<td>PET-CT(^c)</td>
<td>356</td>
</tr>
</tbody>
</table>

\(^a\) The cost of a computerised tomography scan is £100–£172 depending on the number of areas scanned. National Schedule of Reference Costs 2009/10: RA08Z-RA14Z Computerised Tomography Scan.

\(^b\) A magnetic resonance imaging (MRI) scan costs £163–£284 depending on the number of areas scanned. ‘Payment by results’ 2011/12 non-mandatory tariff.

\(^c\) The weighted average cost of a positron emission tomography – computed tomography scan (PET-CT) is £356. National Schedule of Reference Costs 2009/10: RA39Z nuclear medicine – category 5.

3.3.10 As current practice is variable, the incremental cost will need to be assessed on a local level. The costing template that accompanies this report can be used to help commissioners estimate the cost impact.

3.3.11 Any increase in the pressure on MRI and PET-CT scanning services may mean that additional investment will be needed where local capacity cannot absorb incremental activity. The cost of an MRI scanner is estimated at £895,000, and is estimated to have a lifespan of 7–10 years\(^13\). There will also be annual maintenance costs. The capital cost of installing a PET-CT scanner, including the associated building costs is likely to be around £2–2.6 million\(^14\). Where funding for capital investment is not available, additional


scanners could be leased or the activity contracted out to other providers.

3.3.12 These recommendations may result in increased use of multidisciplinary teams. Due to the nature of multidisciplinary teams, the cost cannot be estimated in this report and users should assess any potential impact locally.

3.3.13 The costing template that accompanies this report can be used to help commissioners estimate the potential cost of additional scanning.

**Potential savings**

3.3.14 If MRI and PET-CT scans are used more in future practice there are potential savings through reducing the number of operations that are started but not completed on discovery that the cancer is too widespread for a successful liver resection.

3.3.15 The cost of a hepatectomy is between £6,458 and £10,59015. The potential saving will need to be assessed on a local level. The costing template that accompanies this report can be used to help commissioners estimate the potential saving.

3.4 Chemotherapy for advanced and metastatic colorectal cancer

**Recommendations**

3.4.1 When offering multiple chemotherapy drugs to patients with advanced and metastatic colorectal cancer, consider one of the following sequences of chemotherapy unless they are contraindicated:

---

- FOLFOX (folinic acid plus fluorouracil plus oxaliplatin) as first-line treatment then single agent irinotecan as second-line treatment or
- FOLFOX as first-line treatment then FOLFIRI (folinic acid plus fluorouracil plus irinotecan) as second-line treatment or
- XELOX (capecitabine plus oxaliplatin) as first-line treatment then FOLFIRI as second-line treatment. [Recommendation 1.3.4.1]

3.4.2 Consider raltitrexed only for patients with advanced colorectal cancer who are intolerant to 5-fluorouracil and folinic acid, or for whom these drugs are not suitable (for example, patients who develop cardiotoxicity). Fully discuss the risks and benefits of raltitrexed with the patient. [Recommendation 1.3.4.3]

**Background**

3.4.3 In 2009, 33,604 people were diagnosed with colorectal cancer. Approximately 60% (20,162) of patients present with stage III and IV colorectal cancer.

3.4.4 The introduction of a number of new chemotherapeutic and biological agents has led to significant increases in progression-free and overall survival for patients with advanced and metastatic colorectal cancer. The clinical efficacy of these agents has been the subject of a number of previous NICE technology appraisals. Both oxaliplatin and irinotecan have developed important roles in the management of colorectal cancer – both in combination with fluoropyrimidines and also, for irinotecan, as a single agent. Currently, for patients with advanced metastatic disease, both

---


oxaliplatin and irinotecan can be used to extend disease-free and overall survival.

3.4.5 Where possible the first three combinations (listed in the recommendation above) should be given. However, as all three combinations include fluorouracil, patients who are intolerant to fluorouracil will need an alternative regimen. According to expert opinion, raltitrexed is very useful in patients in whom cardiac side effects limit use of fluoropyrimidines in colorectal cancer chemotherapy. Feedback suggests that this regimen is given as part of current practice.

3.4.6 However, ‘Colorectal cancer (advanced) – irinotecan, oxaliplatin and raltitrexed (review)’ (NICE technology appraisal guidance 93) did not recommend raltitrexed for people with advanced colorectal cancer, unless taking part in a clinical trial. Therefore there is likely to be local variation.

Potential cost impact

3.4.7 Table 3 shows the estimated unit cost of the recommended multiple chemotherapy regimens. For details of how the costs have been calculated please see the costing template.
### Table 3 Indicative cost per patient of multiple chemotherapy regimens for advanced and metastatic colorectal cancer

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Drug cost (£)</th>
<th>Administration cost (£)</th>
<th>Total cost per patient (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLFOX followed by single agent irinotecan</td>
<td>15,794</td>
<td>4471</td>
<td>20,264</td>
</tr>
<tr>
<td>FOLFOX followed by FOLFIRI</td>
<td>16,485</td>
<td>5,477</td>
<td>21,962</td>
</tr>
<tr>
<td>XELOX followed by FOLFIRI</td>
<td>16,385</td>
<td>4,629</td>
<td>21,014</td>
</tr>
<tr>
<td>Raltitrexed</td>
<td>4,410</td>
<td>1,732</td>
<td>6,142</td>
</tr>
</tbody>
</table>

3.4.8 There are potential savings locally where the recommended fluorouracil-based chemotherapy regimens are not part of standard care.

3.4.9 If raltitrexed is already being used as part of current practice for people who are intolerant of fluorouracil, then it is not anticipated that there will be a cost impact as a result of recommendation 1.3.4.3. If alternative regimens are being used, the cost impact will need to be calculated locally.

3.4.10 The costing template that accompanies this report can be used to estimate the cost impact for commissioners based on local circumstances.

### 4 Impact of guidance for commissioners

4.1.1 Initial diagnostic investigations are included in the national ‘Payment by results’ tariff. From 2012/13 healthcare resource group tariffs should differentiate by type and purpose of endoscopy so should generate different tariffs. This is likely to increase the cost

---

18 Please note that at the time of publication (November 2011), irinotecan did not have UK marketing authorisation for this indication. Informed consent should be obtained and documented.

19 The regimens and dosages used are indicative only and practice is likely to vary between providers. Please enter local assumptions on the costing template which accompanies this report.
for commissioners at a local level if the number of colonoscopies increases.

4.1.2 CT and MRI scans are included within the national ‘Payment by results’ tariff but PET-CT scans are outside the scope of ‘Payment by results’.

4.1.3 Chemotherapy is not included in the national ‘Payment by results’ tariff. It is commissioned and paid for using locally agreed prices, with some trusts working with their commissioners to recharge at cost price.

4.1.4 Colorectal cancer is likely to fall under programme budgeting category ‘Cancers and tumours: 202B upper GI and 202C lower GI’.

5 Conclusion

5.1.1 The guidance suggests that colonoscopy should be used as the preferred test to establish a confirmed diagnosis of colorectal cancer in patients without major comorbidities. We do not anticipate that this recommendation will result in an increase in demand for colonoscopy services nationally, however it is difficult to determine what current practice is around the country and there may be variation.

5.1.2 The recommendation to give adjuvant chemotherapy to patients with high-risk stage II colon cancer may represent a change in practice, although there is variation around the country. If adjuvant chemotherapy is not given to this subgroup as part of current practice, there could be additional costs of up to £36 million per year nationally. Offering adjuvant chemotherapy may prevent some patients progressing to advanced disease, resulting in savings.

5.1.3 According to expert clinical opinion, the imaging carried out to look for metastases varies around the country. Any increase in the use
of MRI and PET-CT scans may mean that additional investment will be needed. There are potential savings through reducing the number of operations that are started but not completed on discovery that the cancer is too widespread for a successful outcome.

5.1.4 Three chemotherapy regimens were found to be the most cost effective for the treatment of advanced and metastatic colorectal cancer. There are potential savings locally where the recommended chemotherapy regimens are not part of standard care.

5.1.5 Because of a lack of data and variation in practice it has not been possible to estimate the national cost impact of implementing this guideline. The costing template that accompanies this report can be used to estimate the cost impact locally.
Appendix A. Approach to costing guidelines

Guideline at first consultation stage

- Analyse the clinical pathway to identify significant recommendations and population cohorts affected
- Identify key cost drivers – gather information needed and research cost behaviour
- Develop costing report
- Internal peer review by qualified accountant within NICE
- Circulate report to cost impact panel and GDG for comments
- Update based on feedback and any changes following consultation
- Cost-impact review
- Final sign-off by NICE

Prepare for publication in conjunction with guideline