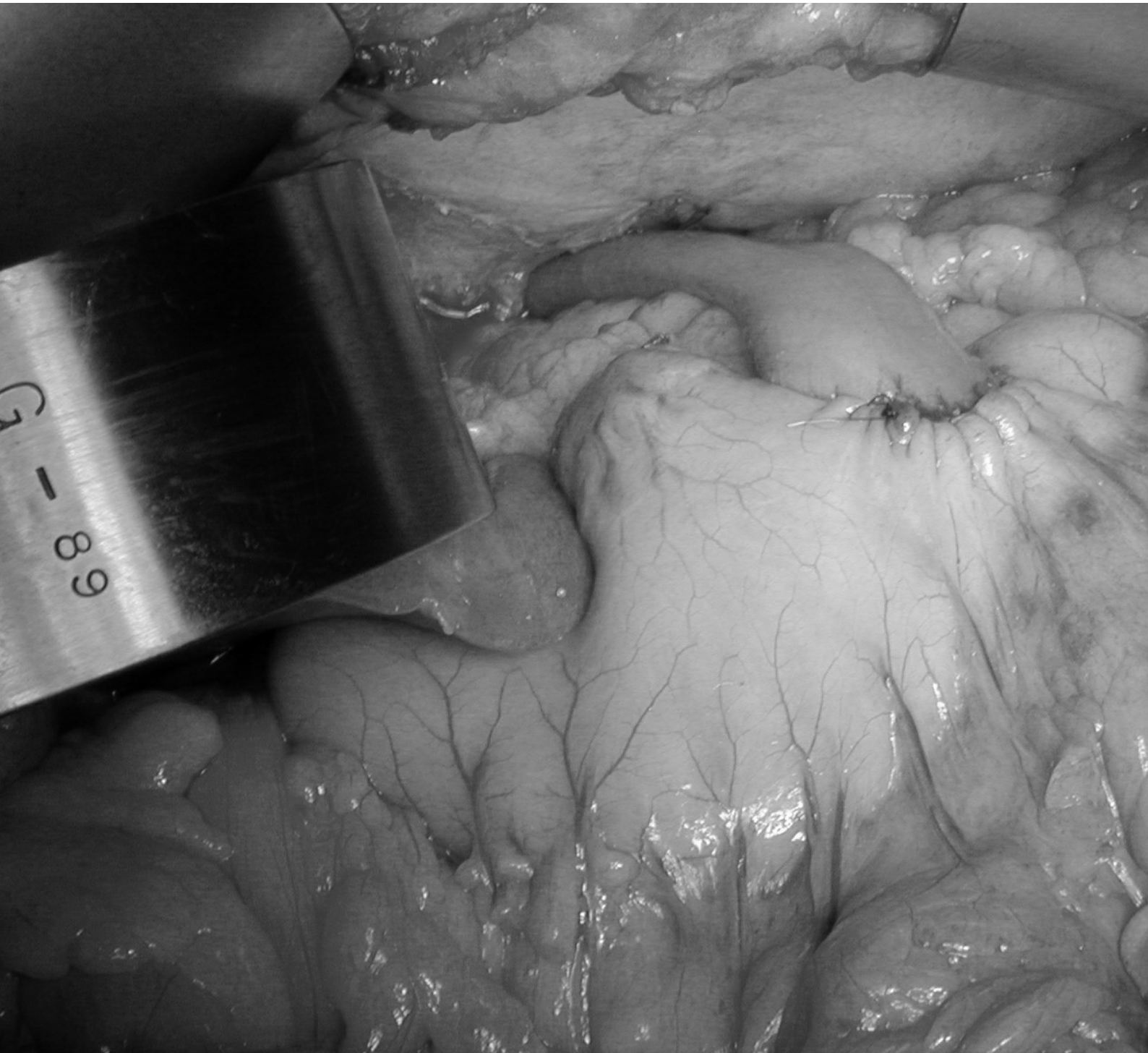
National Oesophago-Gastric Cancer Audit 2013



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The Association of Upper GI Surgeons is the professional body that represents upper gastrointestinal surgeons. It is one of the key partners leading the Audit.

The British Society of Gastroenterology is the professional body that represents gastroenterologists. It is one of the key partners leading the Audit.

The Royal College of Radiologists is the professional body that represents radiologists. It is one of the key partners leading the Audit.

National Oesophago-Gastric Cancer Audit 2013

An audit of the care received by people with Oesophago-Gastric Cancer in England and Wales

Contents

Acknowledgements

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We would like to acknowledge the support of the many hospitals that participated in this Audit and thank them for the considerable time that their staff devoted to collecting and submitting the data. We are also grateful for the support of the Cancer Networks who encouraged and supported the hospitals.

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- The data linkage team at the Health and Social Care Information Centre.

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Foreword

This is the 2013 Annual Report of the Second National Oesophago-Gastric Cancer Audit (NOGCA).

This year's report focuses on the results from the first year of data submission. It summarises information on over 11,000 patients diagnosed with cancer between April 2011 and March 2012. This success has only been possible with the huge effort of all those involved.

A welcome result from this report is that postoperative mortality of patients undergoing curative surgery continues to fall. This finding, together with other Audit results, indicates the benefits that regular MDT meetings and the reorganisation of cancer surgery services have made to patient outcomes.

Other key findings from this Audit report include;

- There continues to be significant variation in standards of care at a Cancer Network level in the routes to referral for diagnosis, use of endoscopic ultrasound and laparoscopy in staging and choice of palliative approach. These areas should be investigated further at a local level.
- Use of both definitive oncology for oesophageal squamous cell cancers and neoadjuvant chemotherapy has risen since the first Audit. It is encouraging to note that chemotherapy appears to be reasonably well tolerated, with three quarters of patients completing planned treatment.
- Palliative oncology is the most common palliative modality. There remains a low uptake of brachytherapy for palliation, and the low use of this should be investigated locally.
- Data collection on patients with High Grade Dysplasia is currently on-going. Information on these patients will be contained in the next annual report and provide much needed information on early detection and treatment of dysplastic lesions of the oesophagus.

We would like to thank all the hospital staff involved in the Audit, from collection and submission of data to analysis and publication of the report. We encourage NHS trusts to use the findings from the Audit to guide care to ensure that they meet the recommendations outlined in the report in order to bring further improvements in local practice.

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Executive summary

This is the 2013 Annual Report of the Second National Oesophago-Gastric Cancer Audit (NOGCA). It builds on the procedures and findings of the First National Oesophago-Gastric Cancer Audit that began in October 2006. Both Audits are part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP) and are commissioned by the Healthcare Quality Improvement Partnership (HQIP).

The second Audit began collecting prospective data on patients (aged 18 years or over) diagnosed with invasive epithelial cancer of the oesophagus, gastro-oesophageal junction (GOJ) or stomach on or after 1 April 2011. Since 1 April 2012, the Audit has also included patients diagnosed with oesophageal high-grade glandular dysplasia (HGD). To allow this, a slightly revised dataset was implemented in April 2012.

The results presented in this report are based on results collected from the Audit between 1 April 2011 and 31 March 2012.

Participation

At the end of the first year of the Second NOGCA, clinical data had been submitted by 153 (99 per cent) of the 154 English NHS organisations that provided O-G cancer care and all Welsh acute NHS trusts. In total, data was submitted on over 11,000 patients. Data received by the Audit included 2,342 curative surgical records, 5,304 primary oncology records and 1,680 endoscopic/radiological palliative records. The overall case-ascertainment for diagnosed cases is 83 per cent and resected cases 89 per cent.

Patient characteristics

The median age of the 11,516 patients at diagnosis was 76 for men and 71 for women, 8.8 per cent were under 55 years. 6,043 (52 per cent) had a tumour in the lower third of the oesophagus or in the gastro-oesophageal junction (GOJ). Another 3,454 (30 per cent) had a stomach tumour.

Patterns of Referral

Route of referral reflects early detection of symptoms and has implications for early diagnosis and curability of oesophago-gastric cancer. 67 per cent of patients were diagnosed after referral by the GP, 15 per cent following emergency admission and 18 per cent following referral from another hospital consultant.

Among the GP referrals, 71 per cent patients were labelled as 'urgent referrals for suspected cancer'. But this proportion was significantly higher among patients with oesophageal tumours compared to those with stomach tumours (74 per cent v 64 per cent, $p<0.001$). The proportion of patients planned to have curative treatment is considerably lower among patients diagnosed after an emergency admission compared to urgent GP referrals. There was significant variation between Cancer Networks in the proportion of patients diagnosed after emergency admission (3 per cent to 32 per cent).

Disease Staging

The first Audit recommended: 'O-G cancer services should ensure that all patients undergo a CT-scan plus an Endoscopic Ultrasound (EUS) (if oesophageal/upper junctional tumour) or a staging laparoscopy (if gastric/lower junctional tumour) before undergoing curative treatment and should improve monitoring of their use'.

Overall, 91 per cent of patients had a CT scan as part of their initial staging. For younger fitter patients, likely to be suitable for surgical resection, this proportion increased to around 96 per cent. This suggests patients who would be suitable for curative treatment are having this key investigation.

The reported use of endoscopic ultrasound and staging laparoscopy was still lower than expected. Among patients with a curative treatment plan:

- 62 per cent of patients with an oesophageal or Siewert I tumour were recorded as having an EUS investigation. But 84 per cent of these patients were reported to have had an EUS or PET-CT, up from 78 per cent in first Audit.
- 57 per cent of patients with a stomach or Siewert II/III tumour were recorded as having a staging laparoscopy, an increase from 49 per cent in the first Audit.

There was significant variation in use of these investigations between Cancer Networks. There remains uncertainty about whether this is due to under-utilisation or under reporting. Further investigation should be undertaken locally.

Treatment planning

Overall, 35 per cent of patients had a curative treatment plan but this fell to 14 per cent for patients diagnosed as a result of an emergency admission. A considerable variation can be observed in the proportion planned to have curative therapy across Cancer Networks (between 20 per cent and 51 per cent).

Among patients with curative intent, curative surgery (with or without oncological treatment) was planned in 88 per cent oesophageal adenocarcinomas or GOJ tumours. For oesophageal squamous cell carcinomas, 50 per cent had surgery (alone or with chemo/radiotherapy), while 48 per cent had definitive chemoradiotherapy or radiotherapy (up from 38 per cent in the first Audit). Curative endoscopic therapy is a relatively new option available for treatment of early cancers, and overall use appears to be increasing since the first Audit (with planned use increasing from 0.8 per cent to 4.5 per cent).

Palliative oncology was the most common planned palliative modality (47 per cent), but there was significant variation in proportion across the Cancer Networks (between 31 per cent and 74 per cent). Best supportive care was the next most common approach, used in 42 per cent of patients. This is an increase since the first Audit and there has been a corresponding decline in use of endoscopic and radiological palliative approaches.

Curative treatment patterns and outcomes

Surgical

Data was submitted to the Audit for 1,220 curative oesophagectomies and 747 curative gastrectomies.

It is very encouraging to note that in-hospital, 30-day and 90-day postoperative mortality has fallen since the first Audit. This Audit showed that the 30-day postoperative mortality for oesophagectomy and gastrectomy was 1.7 per cent (95 per cent CI 1.0-2.5) and 1.1 per cent (95 per cent CI 0.5-2.1), respectively. Postoperative complications remain common, affecting 1 in 3 oesophagectomies and 1 in 7 patients gastrectomies (a slight fall since the first Audit). An unplanned return to theatre was required after 8.9 per cent of oesophagectomies, and 8.1 per cent of gastrectomies.

Overall, lymph node yield and percentage of patients with a positive resection margin remains relatively unchanged since the first Audit. Longitudinal resection margins were positive for 4.1 per cent oesophagectomies and 9.4 per cent gastrectomies.

Since the first Audit there has been an increase in the proportion of operations done using a minimally invasive approach. For oesophagectomies, 15 per cent were done using a fully minimally invasive ("keyhole") approach and a further 28 per cent using a hybrid approach. 18 per cent of gastrectomies were done using a minimally invasive approach. Overall peri-operative outcomes for open and minimally-invasive procedures were broadly similar, although respiratory complications were more frequent after hybrid oesophagectomies. This should be monitored closely in the future.

Oncological

For definitive oncological treatment, this is nearly always combined chemoradiotherapy, and overall completion rates are good with 75 per cent of patients completing their planned treatment. Where oncological therapy is combined with surgery this is most frequently neoadjuvant chemotherapy. For this, completion rates were 79 per cent. The most common reason for failing to complete a planned course of treatment was chemotherapy toxicity, for both neoadjuvant and definitive treatment.

Palliative treatment patterns and outcomes

Where palliative oncology was used, this was most frequently palliative chemotherapy (64 per cent). Only 50 per cent patients completed their planned course of chemotherapy, with the most frequent reasons for failing to complete their treatment being progressive disease during treatment and toxicity of treatment. Patients who received just palliative radiotherapy were generally older and frailer. Overall 93 per cent patients completed their planned course of radiotherapy.

1,680 patients had endoscopic/radiological records submitted to the Audit, of these 1,521 (91 per cent) were for stent insertion and most of these were for oesophageal and junctional tumours. Other treatments (e.g. laser therapy and brachytherapy) were concentrated in particular Networks. This may reflect incomplete data submission but it may also hide variation in the availability of endocscopic/radiological palliative therapies. For instance, only 54 per cent of Networks reported having access to brachytherapy in the most recent NOGCA organisational survey.

Stents were successfully deployed in 98 per cent of procedures. 45 per cent of stents were placed under combined endoscopic and fluoroscopic guidance, but approach varied widely across NHS trusts. There was no association between method of stent placement and reported complications. 57 per cent patients survived more than 3 months after stent insertion, suggesting that these patients may have gained greater benefit from brachytherapy instead.

Recommendations

1. For patients referred for treatment, Networks should know the proportion admitted as emergencies and develop strategies for reducing it within the Network.
2. All patients being considered for curative treatment should undergo an EUS (if oesophageal or upper junctional tumour) or a staging laparoscopy (if gastric or lower junctional tumour). Cancer services should be encouraged to monitor their use.
3. All patients with oesophageal SCC being considered for curative treatment should be discussed with both a clinical oncologist who specialises in the treatment of Upper GI Cancers as well as a surgeon, to discuss the most appropriate treatment approach.
4. Cancer Networks should monitor treatment of patients with early cancers in particular, and consider referral of such patients to specialist endoscopic centres where endoscopic treatment may be an option.
5. As surgical mortality continues to fall, increased focus should go into optimising efficacy of surgery (lymph node yield and proportion of patients with positive longitudinal margins) and complication rates. These should be monitored prospectively by surgeons.
6. Minimally invasive surgery should continue to be introduced cautiously with particular focus on associated complication rates and length of stay.
7. Networks should consider coordinating brachytherapy services as a way to increase uptake.

1. Introduction

The National Oesophago-Gastric Cancer Audit was established to investigate whether the care received by patients with oesophago-gastric cancer is consistent with recommended practice and to identify areas where improvements can be made. It was commissioned by the Healthcare Quality Improvement Partnership (HQIP) and is one of four national cancer Audits currently being undertaken in England and Wales.

The overall aim of the Audit is to measure the quality of care received by patients with oesophago-gastric (O-G) cancer in England and Wales. It will answer Audit questions related to:

1. whether clinical (pre-treatment) staging is performed to the standards specified in national clinical guidelines
2. whether decisions about planned curative or palliative treatments are supported by the necessary clinical data (staging, patient fitness, etc)
3. access to curative modalities for suitable patients, such as neoadjuvant chemotherapy prior to surgical resection
4. the use of oncological and endoscopic/radiological palliative services
5. outcomes of care for patients receiving curative and palliative therapies.

In this report, we describe participation and completeness of data items for NHS trusts and Cancer Networks, patient characteristics and referral patterns, staging investigations and treatment planning and outcomes of curative and palliative therapy.

Key indicators (Table 1.1) used for this report were derived from best evidence and standards on the management and treatment of O-G Cancer (Textbox 1.1).

Table 1.1
Key indicators

Domain	Indicator
Referral and diagnosis	% referred urgently via GP % referred via emergency admission
Staging investigation	% with CT scan % of curative patients with EUS, staging laparoscopy
Treatment planning	% with curative/palliative/no active treatment intent
Curative therapy	% adequate lymph node resection % positive resection margins % (neo) adjuvant therapy % overall complication rate after surgery % anastomotic leak % post-operative in-hospital, 30- and 90-day mortality
Palliative therapy	% completing palliative chemotherapy

Textbox 1.1
Evidence and standards on the management of O-G cancer

- Diagnosis and staging: Many of the symptoms and signs of O-G cancer are non-specific and are present in large numbers of individuals without cancer. Guidelines recommend that general practitioners (GPs) make an urgent referral for an endoscopy assessment only if patients present with "alarm symptoms" (e.g., weight loss, vomiting, dysphagia) or have persistent dyspepsia and are over 55 years [SIGN 2006; NICE 2004]. Various policy initiatives have aimed to improve the diagnostic process. In 2001, English Cancer Networks were recommended to establish fast-track, open-access endoscopy services and agree local referral protocols between general practice and hospital diagnostic services. But, while the majority of patients diagnosed with O-G cancer in the UK are referred by their general practitioner, there are several other referral pathways to the hospital-based O-G cancer team. Some patients are referred following an emergency hospital admission for acute symptoms, while others are referred by another hospital consultant (in the non-emergency setting) who diagnoses or suspects the disease. This latter group includes patients with Barrett's metaplasia under routine surveillance endoscopy. Establishing the disease stage, and consequently options for treatment, requires patients to undergo a number of investigations. Standard investigations currently include computed tomography (CT) scan, endoscopic ultrasound (EUS) and staging laparoscopy [Allum et al 2011]. CT scans are recommended as initial staging, to determine the presence of metastatic disease. Where curative surgery is being considered, further definitive staging should be performed as appropriate. For oesophageal cancer and GOJ cancers this should include positron emission tomography (PET, CT-PET) and EUS with or without staging laparoscopy, while for gastric cancer, it should include a staging laparoscopy with EUS and CT-PET only being used for selected patients.

- Curative treatment: The surgical removal (resection) of the tumour remains the mainstay of curative treatment. Clinical trials have shown that for patients with locally advanced adenocarcinoma of the oesophagus, GOJ and stomach, combining surgery with peri-operative (neoadjuvant) chemotherapy can improve rates of 5-year survival [MRC Lancet 2002; Cunningham et al 2006].

  The regimen for stomach cancer also includes three postoperative (adjuvant) cycles of chemotherapy [MAGIC trial, ST02 trial, Cunningham 2006]. Surgery for O-G cancer is a major undertaking. It is only suitable for patients who are relatively fit, and are found to have localised disease on staging investigations. In the late 1990s, reported 30-day postoperative mortality rates were around 12 per cent for resection of the oesophagus and stomach [SAGOC 2002; McCulloch et al 2003; Jamieson et al 2004]. The level of risk associated with these procedures had improved by the end of the First National O-G Cancer Audit, with reported 30-day postoperative mortality rates of around 4 per cent - 5 per cent, respectively. Nonetheless, patients require between six and nine months to regain their quality of life after this major surgery [Blazeby et al 2000].

  For oesophageal SCC, definitive chemoradiotherapy is also an option: for proximal oesophageal tumours, it is the treatment of choice, while for tumours of the middle or lower third of the oesophagus, it can be used alone or in combination with surgery [Allum et al 2011]. Endoscopic treatments (e.g. endoscopic mucosal resection (EMR) and radiofrequency ablation (RFA)), should also be considered as curative treatment options for intramucosal O-G cancers.

- Palliative treatment: For those patients who are not eligible for radical therapy, a range of palliative treatments exist. The principal aim of palliative care is to achieve the best quality of life for patients and their families by alleviating pain and controlling other symptoms as well as providing psychological and social support. Some oncological treatments may extend life by a short period but the primary aim is the relief of suffering. Palliative treatments essentially fall into two groups: oncological (chemotherapy, radiotherapy or a combination of the two) or endoscopic/radiological (including stenting, argon beam coagulation, laser therapy and brachytherapy). For patients with distal stomach cancers that are obstructing the passage of food out of the stomach, palliative surgery may be required to remove or bypass the obstruction.

Comments from David Eaves
A patient view on diagnosis and treatment of O-G cancer

My symptoms were, I suppose, "classic": difficulty swallowing some foods and having to bring it back up again, paleness (colleagues told me I looked grey), some weight loss and tiredness. The dysphagia could easily have been written off as just trying to swallow too much at a time, but to me it rang loud 'alarm bells'. My father had had similar symptoms in 2006, which he ignored until he could no longer, at which stage he was diagnosed with incurable oesophageal cancer. It is still uncomfortable knowing his suffering and death in August 2009 is one reason I'm still here.

After recognising the symptoms, I saw my GP and explained my concerns and recent family history. I was referred for blood tests and a routine endoscopy, but once the tests showed I was very anaemic my endoscopy appointment was expedited. February 2012, just two days after my 37th birthday I had the endoscopy. The rotten banana taste of the local anaesthetic is unforgettable. I was told something had been found and would be sent off for analysis "in case it was something else". Of course, I pretty much knew what would come next.

A week later my partner and I attended an appointment with an Upper GI surgeon and Cancer Nurse Specialist. The surgeon asked if we had any ideas about the results, and I talked him through everything. A Macmillan nurse was always at my dad's appointments; there wasn't one at mine, so I wondered whether good news might come, but the surgeon explained calmly and considerately that our fears were correct. He reassured me that he thought the cancer was curable with surgery, and that despite my being only 37, I was not the youngest patient he had seen. Despite the glum news, we came away with many positives. The next six weeks were filled with tests, assessing the size and extent of the tumour; fortunately these confirmed there was no spread and treatment would continue as planned. I continued working as much as I could.

Few patients, I suspect, know their oncologist before professional encounters. I expected (and got) no favourable treatment. The oncology appointments were frequently late, but very professional and informative. Clinical trials were discussed, but, weighing up the options, I chose IV infusions over the pink pills that had caused my dad so much distress. The first infusion was complicated by the home infusion pump running through over 3 days instead of the intended 4. Then the side effects started, severe inflammation in my mouth and throat, preventing me eating and drinking, so I required admission for a drip for 3 days. The second cycle was delayed for a week as a result but fortunately passed uneventfully. Even so I couldn't work for another week after.

Then came surgery, an Ivor Lewis oesophagectomy. I consented for it to be observed by a PhD student, she told me it went without incident, although my rib broke "right on cue". After surgery I was moved to HDU and later the ward where I received physiotherapy and rehabilitation, so by the time I left I was at least able to walk again. At a subsequent Patients' Association meeting another surgeon said of the surgery, "we really do hit you with a train". He wasn't wrong! It was two months before I could walk comfortably at any pace. Nine months later, I still tire and feel achy in my ribs sometimes. My scars have healed, so people no longer stare at me in the swimming pool.

What's the real-world difference between me then and now?

- Meals have changed; I can now eat three meals (rather than the initial six snacks) a day, but I still can't eat and drink at the same sitting and it can take me two hours to finish a pint of beer.
- I sleep on my back or my right side on a wedge-shaped pillow, instead of my left side or my front (which itself has stopped my sleep apnoea).
- But I still drive and work full time, socialise occasionally, and sing in choirs.

My quarterly check-ups continue but I know I am not out of the woods yet. The statistics are grim, but I intend being among the third of patients surviving more than 5 years. I have met much older patients who have managed 14 years and more. With relative youth on my side, why can't I last another 30 years? Encouragingly people I meet say if they didn't know what I'd been through they'd never be able to tell.

Reference
Long-term outcomes for patients receiving curative care. National Oesophago-Gastric Cancer Audit. 2012 Annual Report, p28-29 http://www.hscic.gov.uk/article/1165/searchcatalogue?q=%22National+Oesophago-Gastric+Cancer+Audits%22&sort=Date&size=10&page=1#top

Service organisation and policy in England and Wales

Cancer services within England and Wales were organised into Cancer Networks, which provided an integrated model of care. For O-G cancer services, each Network contained one or more specialist cancer centre that provided curative surgical treatment and specialist radiology, oncology and palliative services to all patients living in the area (see Figure 1.1). Diagnostic services and most palliative services continue to be provided by individual NHS organisations (units) within the Network areas.

At the time of data collection, there were 28 Cancer Networks in England and 2 in Wales. For data collected in this second Audit, we will be presenting results using these organisations, and the NHS organisations that were in existence on 1 April 2011.

Figure 1.1
The Cancer Networks and Cancer Centres in England and Wales that existed on 1 April 2011

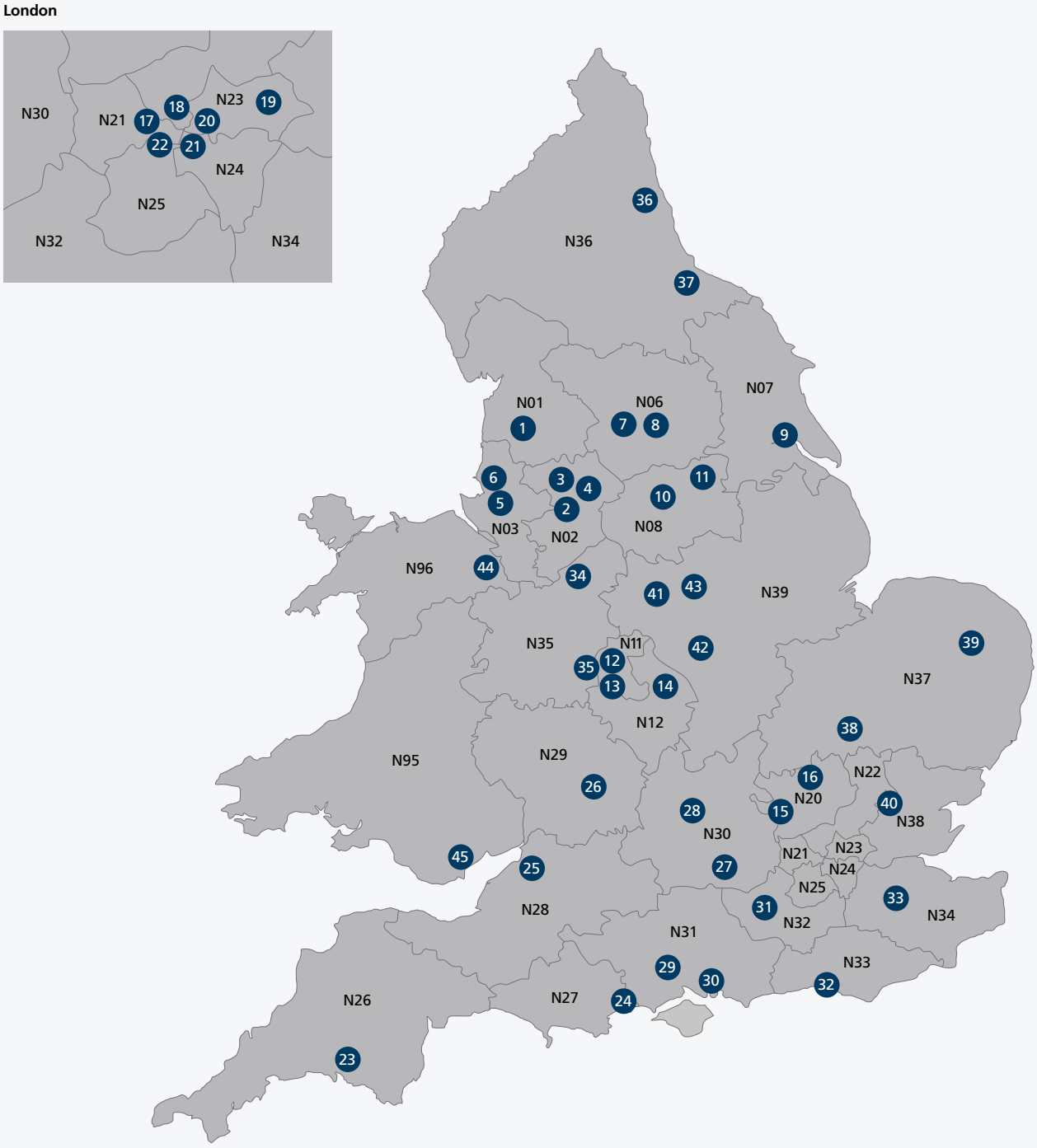
Cancer Centres

ID	Code	Name	ID	Code	Name
1	RXN	Lancashire Teaching Hospitals NHS Foundation Trust	24	RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
2	RM2	University Hospital of South Manchester NHS Foundation Tust	25	RA7	University Hospitals Bristol NHS Foundation Trust
3	RM3	Salford Royal Hospitals NHS Foundation Trust	26	RTE	Gloucestershire Hospitals NHS Foundation Trust
4	RW3	Central Manchester University Hospitals NHS Foundation Trust	27	RHW	Royal Berkshire NHS Foundation Trust
5	RBQ	Liverpool Heart and Chest NHS Foundation Trust	28	RTH	Oxford University Hospitals NHS Trust
6	REM	Aintree University Hospitals NHS Foundation Trust	29	RHM	Southampton University Hospitals NHS Trust
7	RAE	Bradford Teaching Hospitals NHS Foundation Trust	30	RHU	Portsmouth Hospitals NHS Trust
8	RR8	Leeds Teaching Hospitals NHS Trust	31	RA2	Royal Surrey County Hospital NHS Trust
9	RWA	Hull and East Yorkshire Hospitals NHS Trust	32	RXH	Brighton and Sussex University Hospitals NHS Trust
10	RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	33	RWF	Maidstone and Tunbridge Wells NHS Trust
11	RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust	34	RJE	University Hospital of North Staffordshire NHS Trust
12	RR1	Heart of England NHS Foundation Trust	35	RNA	Dudley Group of Hospitals NHS Trust
13	RRK	University Hospital Birmingham NHS Foundation Trust	36	RTD	The Newcastle Upon Tyne Hospitals NHS Trust
14	RKB	University Hospitals Coventry and Warwickshire NHS Trust	37	RTR	South Tees Hospitals NHS Trust
15	RWG	West Hertfordshire Hospitals NHS Trust	38	RGT	Cambridge University Hospitals NHS Foundation Trust
16	RWH	East and North Hertfordshire NHS Trust	39	RM1	Norfolk and Norwich University Hospital NHS Trust
17	RYJ	Imperial College Healthcare NHS Trust	40	RQ8	Mid Essex Hospital Services NHS Trust
18	RRV	University College London Hospitals NHS Foundation Trust	41	RTG	Derby Hospitals NHS Foundation Trust
19	RF4	Barking, Havering and Redbridge Hospitals NHS Trust	42	RWE	University Hospitals of Leicester NHS Trust
20	RNJ	Barts and The London NHS Trust	43	RX1	Nottingham University Hospitals NHS Trust
21	RJ1	Guy's and St Thomas' NHS Foundation Trust	44	7A1	Wrexham Maelor Hospital
22	RPY	The Royal Marsden NHS Foundation Trust	45	7A4	University Hospital of Wales
23	RK9	Plymouth Hospitals NHS Trust			

Cancer Network

Code	Name	Code	Name
N01	Lancashire and South Cumbria	N27	Dorset
N02	Greater Manchester and Cheshire	N28	Avon, Somerset and Wiltshire
N03	Merseyside and Cheshire	N29	3 Counties
N06	Yorkshire	N30	Thames Valley
N07	Humber and Yorkshire Coast	N31	Central South Coast
N08	North Trent	N32	Surrey, West Sussex and Hampshire
N11	Pan Birmingham	N33	Sussex
N12	Arden	N34	Kent and Medway
N20	Mount Vernon	N35	Greater Midlands
N21	North West London	N36	North of England
N22	North London	N37	Anglia
N23	North East London	N38	Essex
N24	South East London	N39	East Midlands
N25	South West London	N95	South Wales
N26	Peninsula	N96	North Wales

Figure 1.1 (Continued)
The Cancer Networks and Cancer Centres in England and Wales that existed on 1 April 2011



2. Methods

Inclusion criteria and Audit method

The Audit is based on prospectively-collected, patient-level data on patients diagnosed with invasive epithelial oesophago-gastric cancer. This information is combined with other available datasets to provide a rich description of the care process and to minimise the burden of data collection on clinical staff.

Patients were eligible for inclusion in the national Audit if they were diagnosed with invasive epithelial cancer of the oesophagus, gastro-oesophageal junction (GOJ) or stomach (ICD-10 codes C15 and C16) **after 1 April 2011**, and were aged 18 years or over.

The inclusion criteria are currently restricted to patients diagnosed in an NHS hospital in England or Wales. In this report, we describe the results of patients diagnosed between 1 April 2011 and 31 March 2012.

The treatment planning of patients with O-G cancer takes place in the context of an NHS multidisciplinary team (MDT) meeting irrespective of whether they were diagnosed in the public or private sector, and the majority of patients in the Audit had received treatment in the NHS only.

Data was submitted by English NHS services to the Audit in two ways:

1. If data was already being collected on a local information system, the relevant data fields were extracted and uploaded to the Audit's secure database via a "csv" file upload facility.

2. Alternatively, data was entered manually via a secure web-based data entry form. Hospital staff had access to a helpdesk during working hours to help with problems and answer questions about data submission.

Data on Welsh patients was produced by CANISC. A copy of the clinical datasheet and the data manual can be downloaded from the Audit website at: www.hscic.gov.uk/og. As data collection using the revised dataset was introduced on 1 April 2012, this report is still based on the dataset from the First Audit. Details of the revised dataset are reported in Textbox 2.1.

Linkage to other datasets

The Audit data was linked to several sources of routine data prior to analysis.

- the Hospital Episode Statistics (HES) in England and Patient Episode Database Wales (PEDW) in Wales,

- Office for National Statistics (ONS) mortality data

National routine data collections for chemotherapy services are currently being established by the National Cancer Intelligence Network (NCIN). We will link the Audit data to these sources as the data becomes available.

Textbox 2.1
Changes to the dataset introduced in April 2012 for presentation in the 2014 Annual Report

As of 1 April 2012, the Audit moved to a slightly revised dataset. Changes to the dataset were made in response to comments from users and lessons learnt during the first Audit. The changes included;

1. The removal of some data items because they were poorly completed or they became obsolete.
2. The inclusion of some new items to improve the capture of patient flows or to improve case-mix adjustment.
3. Provision to enter staging information using TNM version 6 or 7.
4. The revision of data item definitions to reflect changes in practice or to be consistent with data items in the Cancer Outcomes and Services Dataset (COSD).

From April 2012, the Audit also included patients diagnosed with high-grade glandular dysplasia of the oesophagus (HGD). A dataset has been devised to capture information relating to the diagnosis, assessment, management and short term outcomes of these patients. Results will be reported on in the 2014 Annual Report.

The dataset was revised by the Project Team and approved by the Clinical Reference Group, and other stakeholders. In particular, for England, the Audit and the National Cancer Intelligence Network (NCIN) worked together to ensure that the revised dataset and the new Cancer Outcomes and Services Dataset (COSD, version 0.5) were aligned as much as possible. Data items were defined to be consistent with:

- The Scottish Upper GI Cancer dataset (July 2005)
- The All Wales Oesophago-Gastric Cancer Minimum Reporting Requirements v2.0 including Core Reporting Items v5.0
- The Royal College of Pathologists Datasets for reporting oesophageal and gastric cancers
- The Royal College of Radiologists radiotherapy dataset (version 3.7).

A copy of the clinical datasheet and the data manual can be downloaded from the Audit website at: www.hscic.gov.uk/og

Statistical analysis of clinical data

The results of the Audit are presented at different levels: Network level and NHS trust level.

Regional differences in England and Wales are shown using the 30 Cancer Networks that existed on 1 April 2011. To show differences between the geographical regions, Network rates and 95 per cent confidence intervals (CI) are plotted against the overall rate for England and Wales, with Networks ordered according to the number of patients on whom data was submitted or estimated case-ascertainment. English patients were allocated to the Cancer Network based on their NHS trust of diagnosis and not by region of residence.

Averages and rates are presented with 95 per cent CI using the Binomial Exact method. They are typically grouped by their tumour characteristics or Network of treatment.

Differences between the percentages of two groups were assessed using the chi-squared test. Where necessary, multiple logistic regression was used to adjust for potential confounders such as age and sex. To account for a lack of independence in the data of patients treated in the same NHS organisation, the standard errors of the regression coefficients were calculated using a clustered sandwich estimator. All p-values are two-sided and those lower than 0.05 was considered to indicate a statistically significant result. STATA software (version 11.2) was used for all statistical calculations.

In deriving postoperative complication rates for each NHS organisation, multiple logistic regression was used to model the relationship between the rate of each type of complication and measures of patient risk (such as age, sex, tumour site, TNM stage, comorbidities, performance status, ASA grade, neoadjuvant therapy). Separate regression models were developed for each complication rate. These models were devised using information about strength of association between the complication rate and the individual factors (assessed using a Wald test), the calibration of the model (using the Hosmer-Lemeshow goodness-of-fit test), and its power of discrimination (using the c-statistic / ROC curve) [Hosmer and Lemeshow 2000]. The logistic regression model was used to estimate the probability of each complication. The probabilities derived for patients treated at the same organisation were summed to give the predicted number of complications. Risk-adjusted rates for each organisation were then produced by dividing the observed number of complications with the predicted number and multiplying this ratio with the national complication rate. Multiple imputation by chained equations was used to address missing values on case-mix variables when modelling postoperative complication rates for NHS organisations [White IR et al 2011].

The variation in adjusted complication rates of the NHS trusts was examined using a funnel plot [Spiegelhalter 2005]. This plot tests whether the complication rate of any single NHS organisation differs significantly from the national rate. Two funnel limits were used that indicate the ranges within which 95 per cent (representing a difference of two standard deviations from the national rate) or 99.8 per cent (representing a difference of three standard deviations) would be expected to fall if variation was due only to sampling error. The funnel plots use exact binomial limits which become narrower as the number of procedures performed increases. Following convention, we use the 99.8 per cent limits to identify "outliers", as it is unlikely for an NHS organisation to fall beyond these limits solely because of random variation (a 1 in 500 chance).

3. Participation

At the end of the data collection period, clinical data had been submitted by 153 (99 per cent) of the 154 individual English NHS trusts that provided O-G cancer care. This included all of the specialist cancer centres. Data on patients treated in Wales was provided by NHS Wales from the Welsh Cancer Information System (CANISC) and covered all 13 Welsh NHS organisations. A final data extract was taken from the O-G cancer Audit IT system on 30 October 2012. The various data collection forms were linked to produce a single record for each patient. Duplicates and patients diagnosed prior to April 2011 were removed. This left **11,516 patients** with tumour data (Table 3.1).

Table 3.1
Data forms submitted by type of form and England/Wales, after removal of duplicates

Form	England	Wales	Total
Tumour	10,744	772	**11,516**
Primary chemo/radiotherapy	5,155	149	**5,304**
Endo-Palliative	1,557	123	**1,680**
Surgery	2,253	89	**2,342**
Pathology	2,295	99	**2,394**

Case-ascertainment

We estimated that English NHS trusts would enter around 13,003 patients during the Audit period (April 2011 to March 2012). This gives an overall case-ascertainment rate of 83 per cent for the English trusts. One trust did not submit data and 5 trusts (3 per cent) only submitted up to 30 per cent of the expected case-load. Three tertiary treatment centres were excluded from the calculation of case-ascertainment as they were not diagnosing patients. While data is submitted continuously, the majority of data is sent close to the data submission deadline. In September 2012 alone, the month before submission deadlines, 11,435 data forms were submitted, this is 32 per cent of all data forms. Network specific rates are reported in Table 3.2. Case-ascertainment was not calculated for Welsh Networks or trusts as data was submitted to the Audit by CANISC and not by NHS trusts as for England.

Table 3.2
Case-ascertainment by English Cancer Networks

Code	Network name	Expected cases	Patients with tumour records	Case ascertainment
N01	Lancashire and South Cumbria	463	337	73%
N02	Greater Manchester and Cheshire	867	792	91%
N03	Merseyside and Cheshire	667	493	74%
N06	Yorkshire	749	593	79%
N07	Humber and Yorkshire Coast	313	267	85%
N08	North Trent	496	603	122%
N11	Pan Birmingham	503	413	82%
N12	Arden	210	168	80%
N20	Mount Vernon	259	226	87%
N21	North West London	287	247	86%
N22	North London	309	260	84%
N23	North East London	320	279	87%
N24	South East London	332	226	68%
N25	South West London	268	178	66%
N26	Peninsula	463	411	89%
N27	Dorset	222	162	73%
N28	Avon, Somerset and Wiltshire	433	386	89%
N29	3 Counties	398	330	83%
N30	Thames Valley	531	385	73%
N31	Central South Coast	471	421	89%
N32	Surrey, West Sussex and Hampshire	231	195	84%
N33	Sussex	282	258	91%
N34	Kent and Medway	430	262	61%
N35	Greater Midlands	603	386	64%
N36	North of England	919	809	88%
N37	Anglia	684	644	94%
N38	Essex	353	265	75%
N39	East Midlands	940	828	88%
	England	**13,003**	**10,744**	**83%**

*Estimate of the number of patients diagnosed in England with O-G cancer and derived from the number of patients whose first record with O-G cancer (ICD code: C15/C16) in Hospital Episode Statistics was within the Audit period. HES data do not provide a gold-standard for comparison, but can give an indication on major discrepancies between patients submitted in the Audit and patients documented to receiving care for O-G cancer in HES.

Data completeness

The level of completeness for several key data items is summarised in Tables 3.3 and 3.4 opposite. Data completeness for referral source, treatment intent and treatment modality was of good quality. Pre-treatment M-stage data and performance status have the lowest level of completeness among the data items from the tumour record. These data items are important determinants of whether treatment intent will be curative or palliative, and should be available after a patient has a CT scan. In the current data collection period (1 April 2012 to 31 March 2013), that uses the revised dataset, these variables have become mandatory.

Table 3.3
Level of completeness for key data items

Type of record	Variable	Percentage complete
Tumour record	Referral source	91.2%
	Pre-treatment M stage	72.2%
	Performance status	63.8%
	Planned intent	85.9%
	Planned modality	89.5%
Surgery record	ASA grade	83.5%
	Nodal dissection	81.3%
Pathology	T stage	87.1%
	Distal margin involved	97.2%
	Circumferential margin involved	97.0%
Oncology	Outcome of chemotherapy	84.4%
	Outcome of radiotherapy	85.4%
Endoscopy/Radiology	Anaesthetic for stent insertion	66.0%
	Grade	92.6%
	Stent type	84.0%
	Stent placement	60.5%
	Success of stent placement	89.5%

Table 3.4
Data completeness by English Cancer Network

Code	Network	Patients with tumour record	% patients with M-stage after CT scan	% patients with planned treatment intent	% patients with planned modality
N01	Lancashire and South Cumbria	337	83%	45%	25%
N02	Greater Manchester and Cheshire	792	83%	87%	69%
N03	Merseyside and Cheshire	493	64%	81%	42%
N06	Yorkshire	593	63%	78%	57%
N07	Humber and Yorkshire Coast	267	85%	99%	76%
N08	North Trent	603	60%	99%	78%
N11	Pan Birmingham	413	70%	75%	47%
N12	Arden	168	68%	95%	78%
N20	Mount Vernon	226	70%	96%	69%
N21	North West London	247	90%	100%	76%
N22	North London	260	63%	94%	91%
N23	North East London	279	77%	92%	70%
N24	South East London	226	36%	99%	60%
N25	South West London	178	95%	98%	92%
N26	Peninsula	411	75%	96%	76%
N27	Dorset	162	77%	71%	58%
N28	Avon, Somerset and Wiltshire	386	68%	57%	49%
N29	3 Counties	330	71%	82%	71%
N30	Thames Valley	385	50%	92%	62%
N31	Central South Coast	421	83%	91%	78%
N32	Surrey, West Sussex and Hampshire	195	1%	54%	19%
N33	Sussex	258	50%	56%	38%
N34	Kent and Medway	262	39%	69%	76%
N35	Greater Midlands	386	60%	70%	57%
N36	North of England	809	88%	99%	78%
N37	Anglia	644	75%	97%	67%
N38	Essex	265	37%	85%	70%
N39	East Midlands	828	78%	96%	73%

4. Patient characteristics

This chapter provides a summary of the 11,516 patients enrolled in the Audit who were diagnosed between 1 April 2011 and 31 March 2012.

About half (47.3 per cent) of the patients had a tumour of the oesophagus, 22.7 per cent a tumour at the gastro-oesophageal junction and 30 per cent a stomach tumour (Table 4.1). Tumours were most commonly located at the lower or middle third oesophagus for oesophageal cancers and at the body for stomach cancers. Overall, the distribution of cancers by site is very similar to the First NOGCA.

Table 4.1
Distribution of O-G cancer tumours across the various sites

Site	Sub-site	Number of patients	%
Oesophagus 47.3%	**Upper third**	408	7.5
	Middle third	1,611	29.6
	Lower third	3,430	62.9
G-O junction[1] 22.7%	**Siewert I**	1,232	47.1
	Siewert II	692	26.4
	Siewert III	689	26.3
Stomach 30.0%	**Fundus**	545	15.8
	Body	1,717	49.7
	Antrum	736	21.3
	Pylorus	456	13.2
		11,516	

[1] Tumours of the G-O junction are described using the 3 category Siewert classification [Siewert et al 1996]:

I. Adenocarcinoma of the distal oesophagus, the centre of which is within 2-5cm proximal to the anatomical cardia. It may infiltrate the gastro-oesophageal junction from above.

II. True junctional adenocarcinoma, the centre of which is within 2cm above or below of the anatomical cardia.

III. Subcardial gastric adenocarcinoma the centre of which is within the 5cm distal to the anatomical cardia. It may infiltrate the gastro-oesophageal junction from below.

Patients were classified into five groups according to the site and histology of their tumour, corresponding to:

- Squamous cell carcinomas of the oesophagus (Oes SCC)
- Adenocarcinomas of the upper and middle oesophagus (Upper/Mid ACA)
- Adenocarcinomas of the lower third of the oesophagus and Siewert type 1 tumours (Lower/SI ACA)
- Siewert type II and type III tumours (GOJ SII/III)
- Tumours of the Stomach (Stomach).

The disease affected a broad range of patients. Overall, O-G cancer was twice as common in men as women, but there was wide variation across cancer groups with men and women equally affected by oesophageal SCC, but men four times more commonly affected by GOJ tumours compared to women. Median age at diagnosis was 76 years for women and 71 years for men. 8.8 per cent were diagnosed with O-G cancer under the age of 55. Irrespective of type of cancer, male patients were younger at diagnosis (Figure 4.1). A substantial proportion of patients were frail. Between 7.8 per cent and 15.2 per cent of had a performance status of 3 or higher, indicating that they were confined to bed for more than 50 per cent of the time. Just over a third of patients had at least one comorbidity (Table 4.2).

Table 4.2
Summary of patient characteristics by type of tumour, including percentage of patients with different tumour sites

	Oesophageal squamous cell carcinoma	Oesophageal upper/mid adenocarcinoma	Oesophageal Lower / Siewert I	GOJ Siewert II / Siewert III	Stomach	Total
Number of patients (%)						
Total	2,336 (20.2%)	762 (6.6%)	3,583 (31.1%)	1,381 (12.0%)	3,454 (30.0%)	**11,516**
Women	1,152	209	709	290	1,233	**3,593**
Men	1,182	552	2,873	1,088	2,216	**7,911**
Ratio women to men	1:1.0	1:2.6	1:4.2	1:3.8	1:1.7	**1:2.2**
Median age (years)						
Women	75	77	74	74	77	**76**
Men	70	72	69	70	74	**71**
Performance Status[1] >3 (%)	11.7	9.3	8.2	7.8	15.2	**10.9**
Patient with ≥1 comorbidity (%)	33.8	30.1	36.5	36.8	35.0	**35.0**

[1] Performance status based on Eastern Cooperative Oncology Group (ECOG) Score for performance status in cancer patients. 0 denotes perfect health and 4 a patient who is bed-bound, completely disabled and unable to carry out any self-care. Patients scoring 3 or more are capable of only limited self-care, confined to bed or chair >50 per cent of waking hours.

Figure 4.1
Age at diagnosis by type of tumour and sex

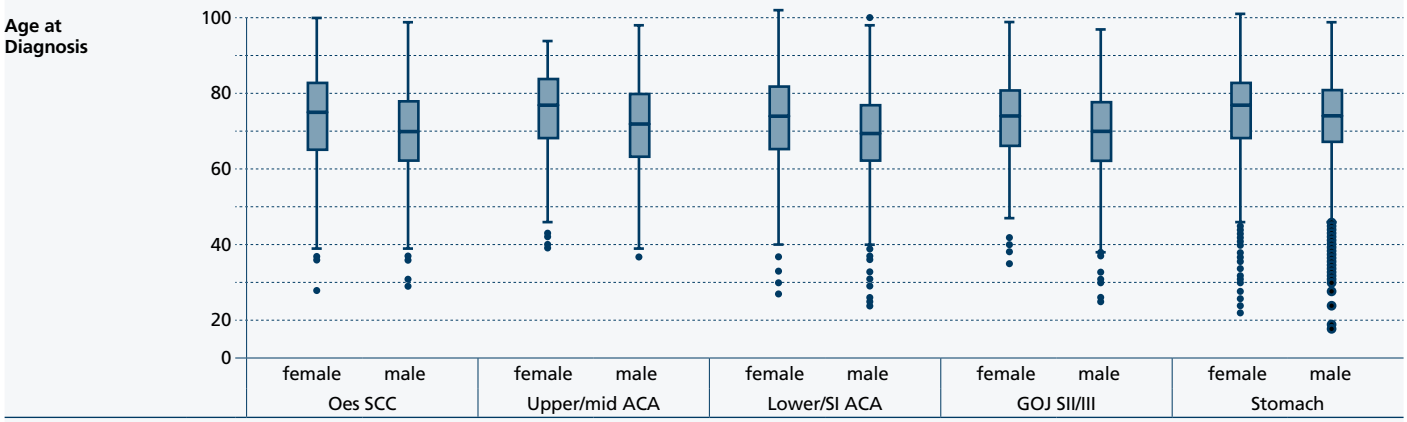


Figure 4.1 shows the age at diagnosis by type of tumour and sex. Box and whisker plots illustrate the distribution of cases for each subgroup. The boxes indicate the lower and upper quartile with the horizontal line in the box indicating the median. The whiskers indicate age ranges within the inter-quartile range. Dots outside the whiskers represent outlying values.

5. Referral patterns

The first Audit highlighted the fact that about 16 per cent of cases of O-G cancer were diagnosed following an emergency admission and that this group of patients were significantly less likely to be considered for curative therapy.

One of the aims of the National Cancer Reform Strategy 2007 was to improve early diagnosis of cancer and therefore outcomes for cancer. The Audit therefore set out to reinvestigate patient referral patterns in England and Wales, looking at three distinct routes to diagnosis: referrals from a general practitioner (GP) which were sub classified as urgent (suspected cancer) or non-urgent, referral after an emergency admission (e.g. via accident and emergency department or medical admissions unit), and 'other hospital referral' for referrals by a hospital consultant from a non-emergency setting.

Audit Findings

Route to Diagnosis

Although most patients were diagnosed with O-G cancer as a result of referral from their GP (Table 5.1), a significant number are still diagnosed following an emergency admission. The percentage diagnosed after an emergency admission has not changed since the time of the first Audit.

The proportion of gastric cancers diagnosed following a GP referral was lower than for oesophageal cancers, and gastric cancers were correspondingly more likely to be diagnosed as a result of an emergency admission (25 per cent vs 11 per cent).

Table 5.1
Source of referral among O-G cancer patients, in England and Wales

Source of referral	Oesophageal or GOJ tumour	Stomach tumour	Overall
Emergency admission	11%	25%	15%
GP referral	71%	56%	67%
Other hospital referral	18%	19%	18%
Total	**7,386**	**3,116**	**10,502**
Missing	**676**	**338**	**1,014**

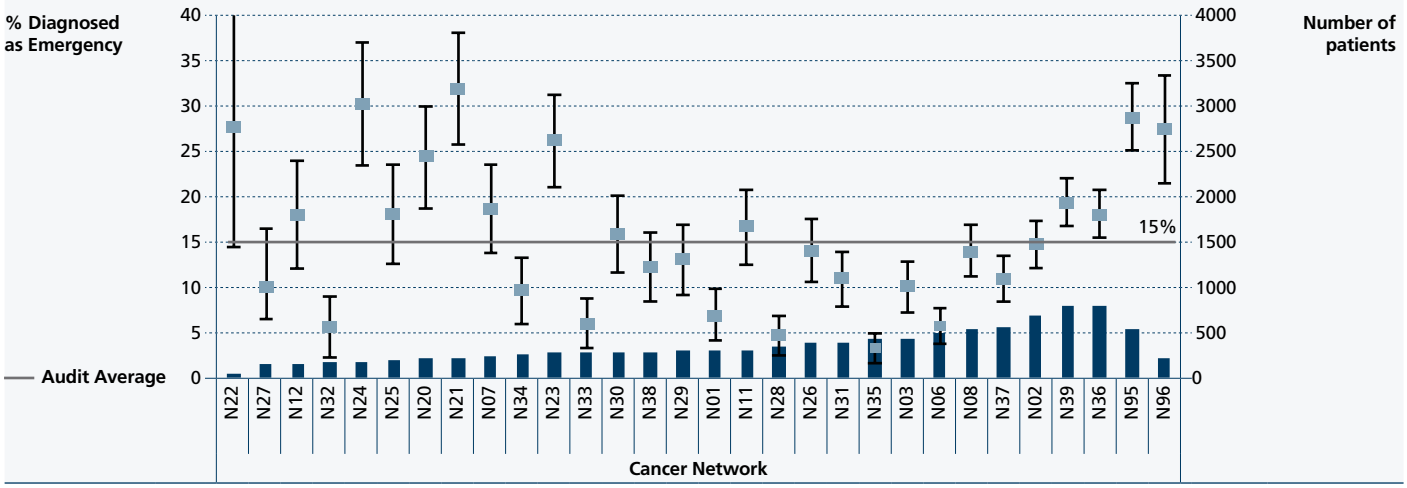
As seen in the first Audit, the proportion of patients diagnosed after an emergency admission increased significantly with age at diagnosis ($p<0.001$), for both oesophageal and gastric tumours (Table 5.2). The reason for this trend is not clear.

Table 5.2
Proportion of patients diagnosed as a result of an emergency admission, by age at diagnosis (years)

	Under 60	60 to 70	70 to 80	Over 80
Oesophageal or GOJ	8%	8%	10%	18%
Stomach	19%	20%	23%	34%

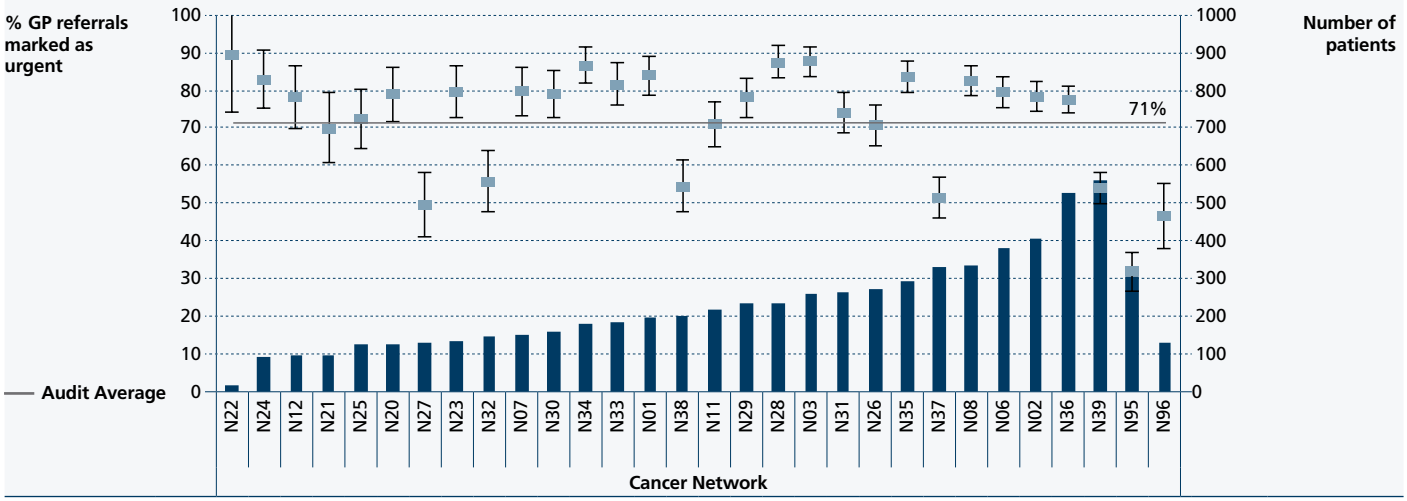
Across Cancer Networks, there was a wide degree of variation in the proportion of cases diagnosed as a result of an emergency admission (Figure 5.1). Several Networks had particularly high proportions of patients diagnosed as an emergency. This is of concern as this group of patients is less likely to have a curative treatment plan. Networks identified in this Audit as having a high proportion of patients diagnosed as an emergency, closely correlated with those identified in the first Audit suggesting differences may reflect differences in the populations served by each Network or it may be a systematic practice of service organisation at a Network level.

Figure 5.1
Proportion of patients diagnosed after an emergency admission by Cancer Network



The Audit dataset classified GP referrals as either 'urgent referrals for suspected cancer' or 'non-urgent'. Across Cancer Networks, there was significant variation for the proportion of GP referrals marked as urgent, ranging from 32 per cent to 89 per cent (Figure 5.2). Among patients referred by their GP, the proportion marked as urgent was higher for oesophageal (74 per cent) than for gastric cancer (64 per cent). For both sites, there was a significant trend towards a greater proportion of urgent referrals with increasing age, from 68 per cent in under-60s to 75 per cent in over-80s. The trend was significant after adjusting for sex, comorbidities and performance status.

Figure 5.2
Number of GP referrals and proportion of GP referrals marked as 'urgent', by Cancer Network in England and Wales.



Waiting time between referral and diagnosis

Waiting times before cancer diagnosis remains an important issue highlighted in the DH publication 'Improving Outcomes: A Strategy for Cancer.' NHS providers are expected to ensure all 'urgent' GP referrals for suspected cancer have a first outpatient attendance within 2 weeks. In contrast, there are no set standards for referrals from other sources. Once a diagnosis of cancer has been made with a decision to treat, the patient should receive first definitive treatment within 31 days.

Table 5.3 describes the delay between date of referral and date of diagnosis. Overall delay between referral and diagnosis for 'urgent' GP referrals remains unchanged since the first Audit, with 55 per cent diagnosed within two weeks and 84 per cent were diagnosed within 4 weeks. For non-urgent GP referrals, waiting times have improved since the first Audit, with 86 per cent now diagnosed within 8 weeks of referral. Only 6 per cent wait more than 3 months, an improvement from 14 per cent in the first Audit.

Table 5.3
Percentage of patients who were diagnosed within a specific time after referral by their GP, by the urgency of referral, comparing data from the first and second Audit

Time between referral and diagnosis	First Audit		Second Audit	
	Urgent	Non-urgent	Urgent	Non-urgent
2 weeks	53%	35%	55%	38%
4 weeks	82%	54%	84%	62%
8 weeks	95%	78%	97%	86%
12 weeks	96%	86%	99%	94%

Across all the Networks, waiting times were consistently longer for routine compared to 'urgent' GP referrals.

- 23 out of 30 Networks diagnosed more than 80 per cent of their 'urgent' GP referrals within 4 weeks, while only 2 Networks managed this for 'routine' referrals.
- Out of 30 Networks, 11 diagnosed more than 60 per cent of routinely referred patients within 4 weeks, this is up from 9 Networks in the last Audit.

Interpretation and Conclusion

Diagnosis of O-G cancer as a result of an emergency admission still accounts for 15 per cent cases. This proportion is higher for gastric than oesophageal cancer, and for older patients. The difference in proportions for oesophageal and gastric cancer could be due to the fact that early symptoms of oesophageal cancer (e.g. dysphagia) are easier to recognise, while gastric cancer tends to present later with less specific symptoms and signs (e.g. early satiety, anaemia and weight loss).

Variation across Networks in the proportion diagnosed after an emergency admission is again evident, with similar Network trends to the first Audit. It is not known whether this difference is due to variations in the populations served by each Network, or due to differences in how patients present to their GP and thresholds for referral from GP.

Urgent GP referrals were consistently diagnosed with O-G cancer quicker than routine referrals, with 84 per cent diagnosed within 4 weeks compared to 62 per cent for non-urgent referrals. But overall waiting times for non-urgent referrals have improved, with 86 per cent diagnosed within 8 weeks as compared to 78 per cent in the first Audit.

In order to improve outcomes for O-G cancer in the future, it is important that Networks with high proportions diagnosed as an emergency investigate this further. Alternatively funding could be found to investigate this nationally. Targeting this area will hopefully reduce the proportion diagnosed as a result of an emergency admission, and improve the likelihood the patient will be considered for curative therapy.

Comparisons with First Audit

- Proportion of patients diagnosed as a result of an emergency admission is unchanged since the first Audit.
- Overall delay to diagnosis from referral has improved for both urgent and routine GP referrals, with 84 per cent of urgent referrals and 62 per cent of routine referrals diagnosed within 4 weeks, compared to 82 per cent and 54 per cent respectively in the first Audit.
- The proportion of routine GP referrals considered for curative therapy has increased from 36 per cent to 44 per cent.

Comment from Mr David Kirby
(Chairman – Oesophageal Patients Association)

The early symptoms of a possible oesophageal problem are likely to be very common, e.g. heartburn or indigestion, which many would put down to lifestyle matters. The problems might then disappear – Barrett's oesophagus – but may reappear, in my case many years later, and could indicate a change in the oesophageal cells to a cancerous condition.

Difficulties for early diagnosis arise from the patient not putting emphasis on the persistence of symptoms and GPs understandably not relating them to a relatively uncommon disease. Medication for the relief of symptoms may be given for rather long periods, again leading to a late diagnosis.

The Oesophageal Patients Association has launched, in conjunction with other organisations, an awareness campaign to alert the public and all GP surgeries to the symptoms that can sometimes lead to the development of oesophageal cancer. The aim is for people to seek medical advice sooner and for GPs to be more aware of the possible significance of persistent symptoms. With the increasing incidence of oesophageal cancer earlier diagnosis is vital for improved survival rates.

It is also necessary for such referrals to be made to hospitals where expertise in these areas is recognised. Patients increasingly ask about the expertise involved and they are willing to travel further for such expertise. They want to know how many cases are treated by each consultant, the number of consultants involved (at least two), and the results obtained.

Reference

www.actionagainstheartburn.org.uk

Comments from Dr Greg Rubin
(Professor of General Practice and Primary Care)

Early diagnosis and efficient referral of patients with suspected oesophageal and gastric (O-G) cancer is not straightforward. The 'alarm' symptoms of dysphagia and weight loss are reported by only 32 per cent and 8 per cent of patients with O-G cancers, and their presence correlates with advanced stage disease. Several other symptoms predict O-G cancer, but with absolute risks in the region of 1 per cent [Stapley et al 2013]. Not surprisingly, therefore, 25 per cent of oesophageal and 36 per cent of gastric cancer patients visit their GPs three times or more before diagnosis [Lyratzopoulos et al 2012]. The findings of this Audit are consistent with both the National Audit of Cancer Diagnosis in Primary Care [Rubin et al 2011] and recent published research. There is a predictable inverse relationship between the proportion of cases diagnosed through urgent referral (the detection rate) and emergency presentation. What is striking is the threefold variation between Cancer Networks in detection rates. If this is to be believed, it points to system differences at the interface between primary and secondary care that need urgently to be understood.

One explanation is ease of access to gastroscopy, whether by 2 Week Wait or direct access referral. A recent study has shown a clear inverse relationship between the gastroscopy rates by general practice and mortality from oesophago-gastric cancer [Shawihdi et al 2013]. In general, endoscopy rates are much higher in mainland Europe [Bisschops et al 2001], probably contributing to the observed better survival. Increasing endoscopy rates was earmarked as a priority in the first annual report of the cancer reform strategy. However, endoscopy has resource limitations, and an increase in activity should target patients who are most likely to benefit. Clinical decision support tools for GPs are now being piloted by the National Cancer Action Team as an aid to patient selection for specialist assessment.

Reference

Bisschops R, Wilmer A, Tack J. A survey on gastroenterology training in Europe. Gut 2002; 50(5):724-29.

Lyratzopoulos G, Neal RD, Barbiere JM, Rubin GP, Abel GA. Variation in number of general practitioner consultations before hospital referral for cancer: findings from the 2010 National Cancer Patient Experience Survey in England. The Lancet Oncology 2012. DOI:10.1016/S1470-2045(12)70041-4

Rubin G, Elliott K, McPhail S. National Audit of Cancer Diagnosis in Primary Care. London: RCGP, 2011.

Shawihdi M, Thompson E, Kapoor N, Powell G, Sturgess R, Stern N, et al. Variation in gastroscopy rate in English general practice and outcome for oesophagogastric cancer: retrospective analysis of Hospital Episode Statistics. Gut 2013; In press.

Stapley S, Peters TJ, Neal RD, Rose PW, Walter FM, Hamilton W. The risk of oesophago-gastric cancer in symptomatic patients in primary care: a large case-control study using electronic records. Br J Cancer 2013; 108(1):25-31.

6. Staging investigations

This chapter describes the use of CT, endoscopic ultrasound (EUS) and staging laparoscopy in staging. The first Audit recommended: 'O-G cancer services should ensure that all patients undergo a CT-scan plus an EUS (if oesophageal/upper junctional tumour) or a staging laparoscopy (if gastric/lower junctional tumour) before undergoing curative treatment and should improve monitoring of their use' (Textbox 6.1).

The first Audit suggested that with 30 per cent of patients being considered for curative therapy, it is crucial that appropriate staging investigations are used to select this group of patients. Initial staging is aimed at ruling out the presence of metastatic disease with a CT scan and, increasingly a PET-CT scan. If curative therapy is being considered more precise local staging is recommended e.g. EUS or staging laparoscopy. In the first Audit, use of CT was reported to be good, but use of EUS and staging laparoscopy for patients with a curative treatment plan was lower than expected (this could have been due to under reporting of investigations by some units).

Textbox 6.1
Recommendations for staging investigations

- CT Chest/Abdomen/Pelvis: Initial assessment, to look for metastatic spread.
- EUS: Provides more accurate assessment of both depth of tumour invasion (T) and loco-regional nodal (N) staging than CT, for oesophageal and junctional tumours. Addition of fine needle aspiration may further improve diagnostic accuracy [Vazquez-Sequeiro et al 2001].
- Staging Laparoscopy: For gastric and junctional tumours this allows direct visualisation of low volume peritoneal or hepatic metastasis, and assessment of degree of local spread. Addition of peritoneal cytology may also help to identify patients with a poor prognosis [Nath et al 2008].
- PET-CT: Addition of PET-CT to CT and EUS for oesophageal and junctional tumours may increase the sensitivity of detection of spread to regional and distant lymph nodes, and metastatic disease [Allum 2001].

Data Quality

The Audit dataset questions relating to staging were not mandatory. As a result, the data quality in this field was variable for different NHS trusts. We therefore excluded from analysis in this chapter NHS trusts where less than half of patients were reported to have had an initial staging CT, and NHS trusts where no patients were reported to have had an EUS or staging laparoscopy.

Audit Findings

Use of CT in disease staging

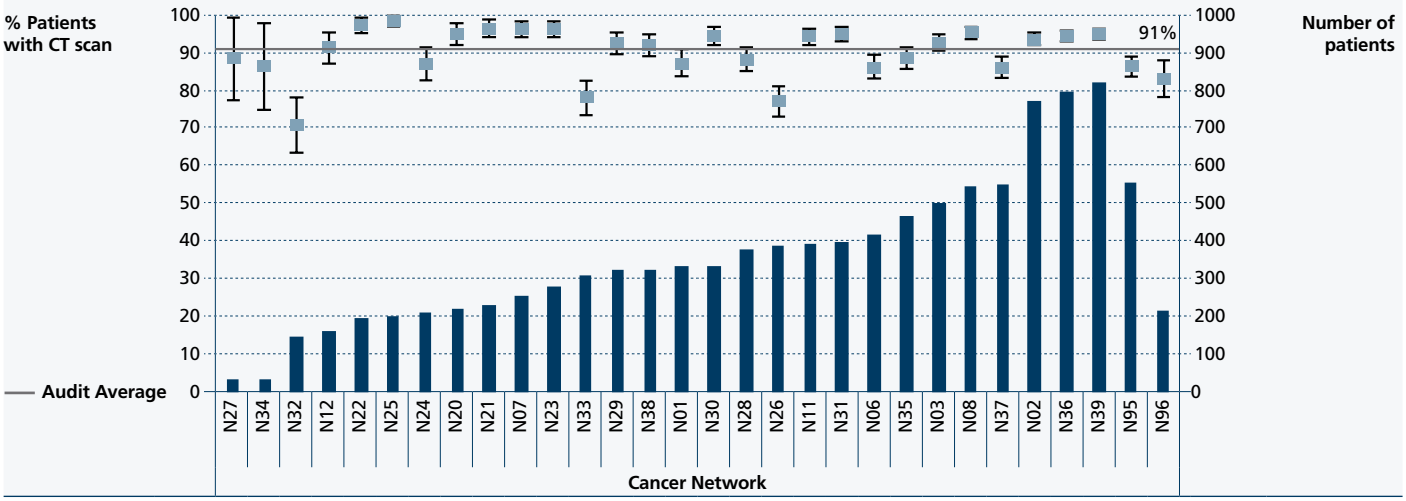
Overall 91 per cent out of 10,846 patients had a CT scan as part of their initial staging. For younger, fitter patients around 96 per cent were reported to have had a CT scan (Table 6.1).

Across Cancer Networks in England and Wales, there was variation in the use of CT (Figure 6.1). Further inspection of the data by NHS trust suggests that Network outliers can probably still be accounted for by poor data entry at a trust level rather than true variation in clinical practice. Overall there was a high level of compliance with the recommendation that all patients should have a CT as part of initial staging. The reduction in the proportion having a CT scan among older patients with poor performance status is consistent with good clinical judgement, as they are less likely to be amenable to curative therapy. Use of CT was similar across all age groups for both oesophageal and gastric cancer.

Table 6.1
Proportion of patients who were reported to have had a CT scan, by age and performance status

	Performance status					
Age Group (Years)	**0**	**1**	**2**	**3**	**4**	**Total**
Under 60	96%	98%	99%	93%	93%	**97%**
61 – 70	98%	96%	95%	95%	88%	**96%**
71 – 80	95%	96%	95%	91%	83%	**95%**
80 or over	92%	92%	90%	81%	77%	**87%**
Total	**96%**	**96%**	**94%**	**88%**	**81%**	

Figure 6.1
Proportion of patients who were reported to have had a CT-scan, by Cancer Network in England and Wales.

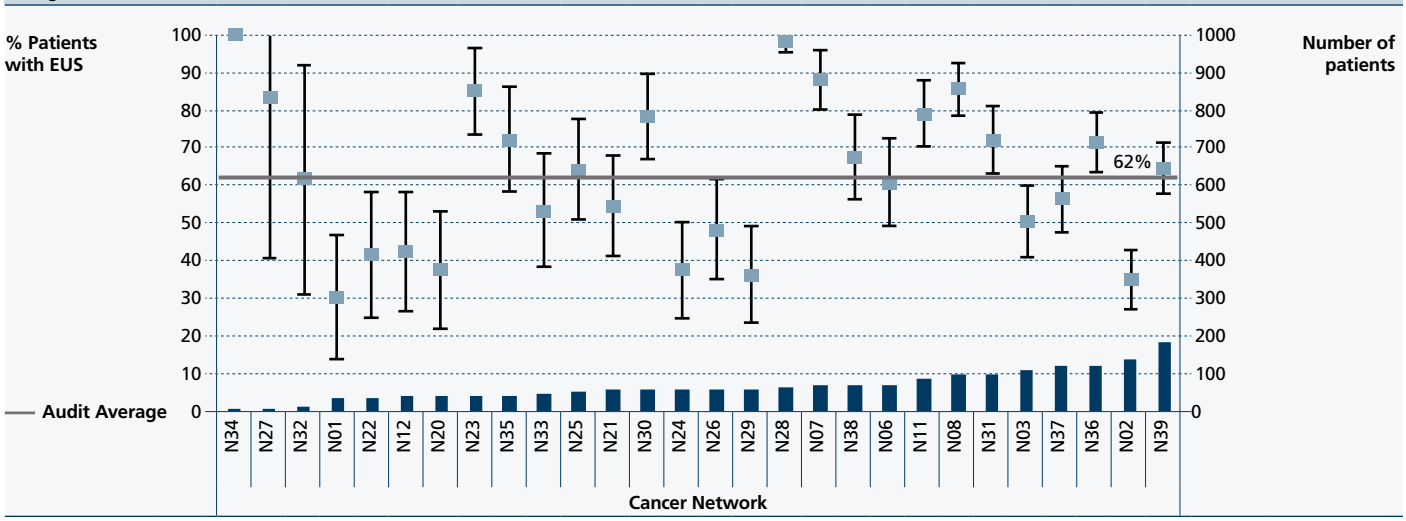


Use of EUS and laparoscopy in staging

Staging of Oesophageal and Siewert I cancers

62 per cent of patients with planned curative intent had a staging EUS. Figure 6.2 shows the reported use of EUS in this group according to Cancer Networks. Note that the Welsh Networks (N95 and N96) had not submitted any data regarding use of EUS in staging, hence they have been excluded.

Figure 6.2
Proportion of patients with oesophageal or Siewert I tumours being managed with curative intent reported to have had a CT scan and EUS, by Cancer Network in England

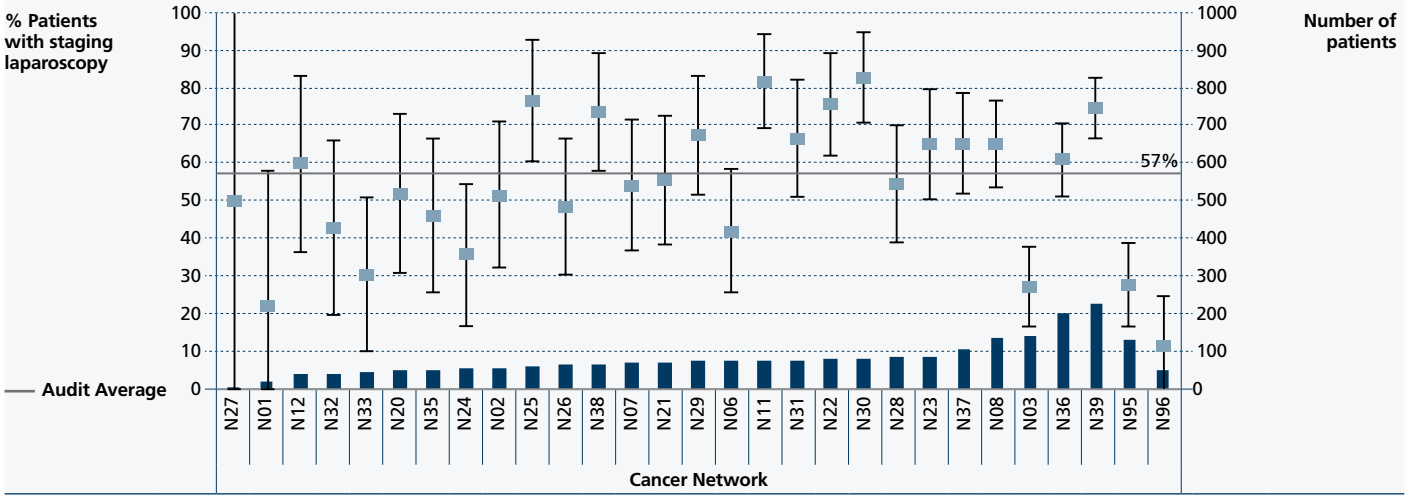


PET-CT can be used to improve the accuracy of N and M staging in oesophageal and junctional tumours, compared to CT alone. The first Audit found that around 78 per cent of patients with a curative treatment plan were reported to have had an EUS or PET-CT, this figure has now increased to 84 per cent.

Staging of Stomach and Siewert II/III cancers

57 per cent of patients with potentially curative gastric or Siewert II/III cancers had a staging laparoscopy. Again there was significant variation between Networks as shown in Figure 6.3.

Figure 6.3
Proportion of patients with gastric or Siewert II/III tumours being managed with curative intent who were reported to have had a CT scan and staging laparoscopy, by Cancer Network in England and Wales



Conclusions on Staging

The use of basic staging investigations is good, with around 96 per cent of patients likely to be considered for curative surgery on basis of age and performance status having a CT scan to look for metastatic spread. Patients who are older with poor performance status were less likely to have a CT scan.

The use of EUS and staging laparoscopies for definitive staging prior to planned curative surgery appears to be very variable. Several of the Networks where use of EUS was reported to be low in the first Audit, had low reported use this time as well. This suggests that the results reflect variation in clinical practice and not just variation in reporting. Utilisation appears to be suboptimal, with only 62 per cent having an EUS and 57 per cent having a staging laparoscopy as appropriate prior to planned curative surgery.

Compared to the last Audit, the proportion of patients reported to have had an EUS or PET-CT increased, suggesting that NHS trusts are putting more emphasis on providing good staging investigations prior to potentially curative therapy.

Comparison with First Audit

- Similar use of CT scan for initial staging with over 90 per cent having one.
- There has been no change in reported use of EUS prior in patients with oesophageal or Siewert I cancers, where treatment intent was curative. But use of staging laparoscopy in patients with gastric or Siewert II/III cancers has increased from 49 per cent to 57 per cent, where treatment intent was curative. But overall reporting of these key staging investigations is poor.
- Increased use of PET-CT for staging of oesophageal and junctional tumours. 84 per cent patients had a CT-PET or EUS in this Audit, compared to 78 per cent in the first Audit.

Comment from Dr Nick Carroll (Consultant Radiologist, Addenbrookes Hospital)

It is disappointing that there are a persistently low percentage of patients offered EUS for loco-regional staging of new O-G cancer, although use of FDG-PET has increased. The first Audit suggested that differences in use of EUS could be due to recording errors, the new figures show that these differences continue and are therefore more likely due to deliberate policy.

Studies have shown that EUS has superior T staging ability over PET and CT [Lowe et al 2005]. But in N and M staging a recent meta-analysis [van Vliet et al 2008] suggested EUS, CT, and FDG-PET each play their own distinctive role. For detection of regional lymph node metastases, EUS is most sensitive, whereas CT and FDG-PET are more specific tests. But for the evaluation of distant metastases, FDG-PET probably has a higher sensitivity than CT. Combining CT and FDG-PET could be of clinical value, with FDG-PET detecting possible metastases and CT confirming or excluding their presence and determining their location.

EUS can provide an additional role, in guiding biopsy of distant nodes. One study found that EUS-guided biopsy of distant lymph nodes was indicated in 20 per cent of patients with oesophageal cancers, and resulted in tumour upstaging in about 80 per cent of cases, and influenced treatment decision in about 60 per cent [Giovannini 1999].

The Audit demonstrates an increased use of further staging techniques, with a rise in the use of CT-PET. But it should be recognised that EUS, CT and PET each play a distinctive role in the accurate staging of oesophageal cancer.

Reference

Giovannini M, Monges G, Seitz JF, Moutardier V, Bernardini D, Thomas P, et al. Distant lymph node metastases in esophageal cancer: impact of endoscopic ultrasound-guided biopsy. Endoscopy. 1999;31(7):536-40.

Lowe VJ, Booya F, Fletcher JG, Nathan M, Jensen E, Mullan B, et al. Comparison of positron emission tomography, computed tomography, and endoscopic ultrasound in the initial staging of patients with esophageal cancer. Molecular imaging and biology : MIB : the official publication of the Academy of Molecular Imaging. 2005;7(6):422-30.

van Vliet EP, Heijenbrok-Kal MH, Hunink MG, Kuipers EJ, Siersema PD. Staging investigations for oesophageal cancer: a meta-analysis. Br J Cancer. 2008;98(3):547-57.

7. Treatment Planning

Once staging of O-G cancer has determined the extent of the disease, decisions regarding whether curative or palliative treatment is appropriate need to be taken at the upper gastro-intestinal team MDT meeting. Decisions need to take account of both patient factors (e.g. comorbidities, nutritional status, patient preferences) and staging information. Current curative treatment options are discussed in Textbox 7.1.

Textbox 7.1
Current curative treatment plan recommendations [Allum et al 2011]

Oesophageal squamous cell carcinoma:

- Definitive chemoradiation for proximal oesophageal tumours
- For tumours of the middle or lower oesophagus either chemoradiotherapy alone or combined with surgery.

Oesophageal adenocarcinoma and GOJ tumours:

- Preoperative chemotherapy or chemoradiation is recommended to improve long term survival after surgery, compared to surgery alone.
- Peri-operative chemotherapy (pre and post-operative) can also be recommended as it increases survival for Siewert II and III cancers.

Gastric cancer:

- Peri-operative chemotherapy is recommended to improve survival compared to surgery alone.
- In patients at high risk of recurrence who have not had neoadjuvant chemotherapy, adjuvant chemoradiotherapy may be considered as it has been shown to improve survival in non-Western populations.

Curative Treatment

Options include surgery, oncological therapy (alone or in combination with surgery) and endoscopic therapy. Endoscopic treatment is only an option where disease is limited to the mucosa and there is little risk of lymph node spread. Studies have shown this approach is associated with good long term outcomes [Ell et al 2007, Inoue et al 2002]. Once there is deeper submucosal invasion, the risk of lymphatic spread is more than 20 per cent [Stein et al 2005] and so surgery with or without oncological therapy is recommended.

Palliative Management

Patients managed with palliative intent can be considered for palliative chemotherapy. This can improve survival in patients with a good performance status. Alternatively, treatment can focus on managing symptoms such as dysphagia with appropriate endoscopic or radiological intervention (e.g. stents) or radiotherapy. Patients with non-specific symptoms who are frail and have incurable disease require a holistic approach to their treatment (best supportive care).

Audit Findings

Overall treatment plan intent was completed for 9,895 (86 per cent) patients in the Audit. Where treatment intent was documented 35 per cent had a curative treatment plan, this is very similar to the first Audit. But for patients diagnosed as a result of an emergency admission, only 14 per cent had a planned curative intent compared to 37 per cent diagnosed through the GP route and 43 per cent diagnosed after referral from another hospital consultant.

Further analysis of treatment intent by tumour site showed that lower oesophageal and junctional tumours were slightly more likely to be suitable for curative treatment (Table 7.1).

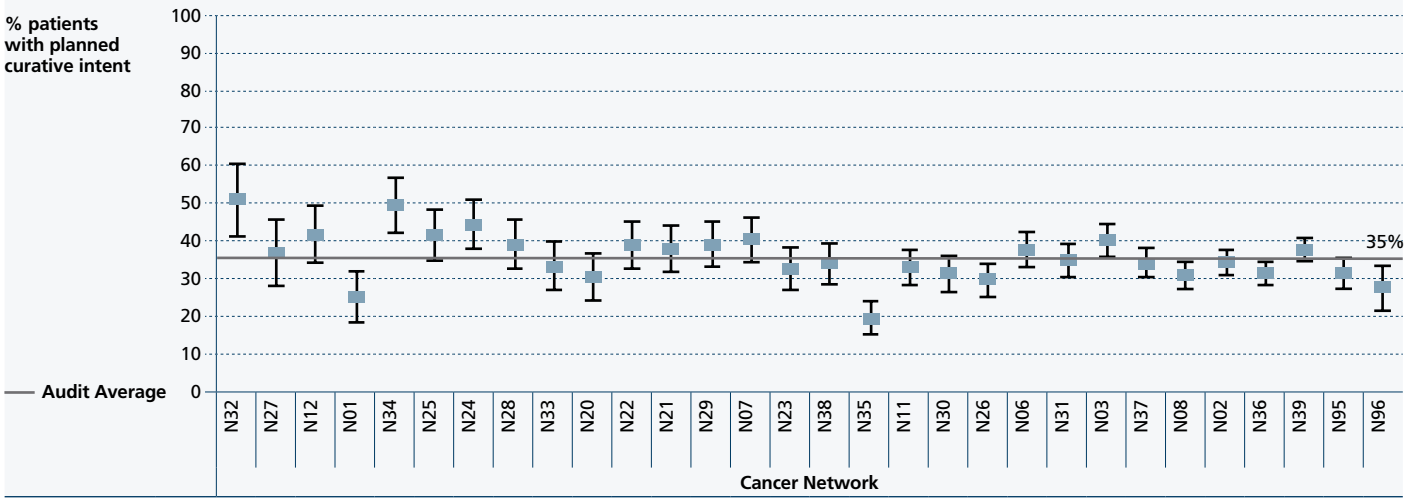
Table 7.1
Treatment intent by type of tumour

	Oes SCC	Upper/Mid ACA	Lower/SI ACA	GOJ SII/SIII	Stomach	Total
Curative	33%	30%	40%	37%	31%	**35%**
Palliative	67%	70%	60%	63%	69%	**65%**
Total	**1,964**	**641**	**3,119**	**1,178**	**2,993**	**9,895**
Missing	**372**	**121**	**464**	**203**	**461**	**1,621**

Planned curative therapy

At a Network level, there appears to be some variation in the proportion of patients offered curative therapy as shown in Figure 7.1. Patients considered for curative therapy were generally younger at diagnosis, had a better performance status, lower stage disease and less than two comorbidities. Some of this variation may be due to lower rates of case-ascertainment.

Figure 7.1
Proportion of patients managed with curative treatment plans, by Cancer Network (ordered by increasing number of cases)



The type of curative therapy planned according to tumour site is shown in Table 7.2. Curative surgery with or without additional oncological therapy was the main curative approach for all oesophageal adenocarcinomas and gastric cancers. But for oesophageal SCC both surgery (with or without additional oncological therapy) and definitive oncological therapy were frequently used as the planned curative modality. It is interesting to note that, since the last Audit, the proportion of patients with SCC undergoing surgery alone has fallen from 17 per cent to 12 per cent, while use of definitive chemoradiotherapy has increased from 31 per cent to 38 per cent. This suggests clinicians are increasingly choosing the least invasive modality where survival outcomes are comparable.

Table 7.2
Curative treatment modalities used, by tumour type

	Oes SCC	Upper/Mid ACA	Lower/SI ACA	GOJ SII/SIII	Stomach	Total
Curative						
Surgery Alone	12%	22%	18%	21%	47%	**25%**
Radiotherapy Alone	10%	5%	4%	2%	1%	**4%**
Chemotherapy and Surgery	35%	55%	62%	70%	46%	**54%**
Definitive Chemoradiotherapy	38%	8%	8%	3%	2%	**11%**
Chemoradiotherapy and surgery	3%	1%	2%	1%	1%	**2%**
Endoscopic mucosal resection	2%	9%	6%	3%	4%	**4%**
Total	**642**	**177**	**1,250**	**451**	**911**	**3,431**
Missing	**44**	**22**	**72**	**29**	**68**	**235**

Use of peri-operative chemotherapy has become the standard of care for locally advanced gastric cancer and Siewert II/III cancers throughout the UK, while preoperative chemotherapy is recommended for operable mid/distal oesophageal cancers [Allum et al 2011]. Frequency of planned chemotherapy use compared to surgery alone for all tumour sites is shown in Table 7.3.

Table 7.3
Percentage of patients planned to receive peri-operative chemotherapy in addition to surgery, according to tumour site and final pre-treatment stage

Tumour Site	Stage 1			Stage 2/3			Stage 4		
	Number Patients	Surgery Alone	Surgery + peri-op chemo	Number Patients	Surgery Alone	Surgery + peri-op chemo	Number Patients	Surgery Alone	Surgery + peri-op chemo
Upper/Mid ACA	7	100%	0%	101	22%	78%	11	18%	82%
Lower/SI ACA	70	90%	10%	709	14%	86%	40	18%	82%
GOJ SII/III	11	91%	9%	285	21%	79%	8	13%	87%
Stomach	186	72%	28%	334	37%	63%	105	28%	72%
Total	**274**	**78%**	**22%**	**1,427**	**21%**	**79%**	**164**	**24%**	**76%**

The results suggest that oncological therapy in addition to surgery is being used appropriately. This change should bring an improvement in long-term survival. Use of peri-operative oncological treatment for locally advanced (stage 2 and 3) gastric cancers has improved significantly since the first Audit (from 55 per cent to 63 per cent), while use in oesophageal cancer is unchanged. It is likely that the uptake for peri-operative chemotherapy for gastric cancer is lower than for oesophageal as the guidelines for its use came out later, and patients with stomach cancer are generally older and have a poorer performance status.

Curative endoscopic treatment for early cancers is a relatively new treatment option, which has been shown to be effective if there is no suspicion of lymph node involvement. The Audit data suggests that overall planned use of endoscopic mucosal resection has increased for all O-G cancers where the treatment plan is curative (accounting for 4.5 per cent of curative treatment plans in this Audit compared to 0.8 per cent in the first Audit). We analysed further the use of EMR in early stage oesophageal and gastric cancer (Table 7.4).

Table 7.4
Planned curative treatment choice for early O-G cancers (T0/1, N0, M0)

	EMR, n (%)	Any other therapy n (%)	Total
Oesophageal cancer	50 (27%)	134 (73%)	**184**
Gastric cancer	14 (18%)	62 (82%)	**76**
Total	**64 (25%)**	**196 (75%)**	**260**

We note that at an individual Cancer Network level there was variation in the proportion of early stage cancers treated endoscopically. While 9 Networks did not perform any EMRs for early stage cancers, Anglia Cancer Network (N37) treated 6 out of 13 (46%) of their early cancers with an EMR.

Palliative treatment planned

5,738 patients were managed with palliative intent. The choice of palliative treatment is shown in Table 7.5. Where treatment modality was known 42 per cent received best supportive care. For stomach cancer, this proportion was 55 per cent. This is a result of fewer being suitable for endoscopic therapy such as stenting (commonly used for dysphagia in oesophageal cancer) and fewer being suitable for palliative oncology (due to older age group and poorer performance status).

Table 7.5
Palliative treatment modalities used, by tumour type

	Oes SCC	Upper/Mid ACA	Lower/SI ACA	GOJ SII/SIII	Stomach	Total
Palliative						
Palliative Surgery	1%	1%	1%	0%	3%	**1%**
Palliative Oncology	49%	45%	52%	57%	38%	**47%**
Endoscopic or radiological palliation	14%	15%	11%	7%	4%	**9%**
Best Supportive Care	36%	40%	36%	36%	55%	**42%**
Total	**1,205**	**392**	**1,667**	**631**	**1,843**	**5,738**
Missing	**97**	**56**	**153**	**105**	**178**	**589**

The most common planned treatment modality for palliative patients was palliative oncology. At a Network level there appeared to be significant variation in use of both palliative oncology and best supportive care (Figures 7.2 and 7.3).

Figure 7.2
Proportion of palliative patients who were planned to receive palliative oncology, by Cancer Network in England and Wales (ordered by increasing number of cases)

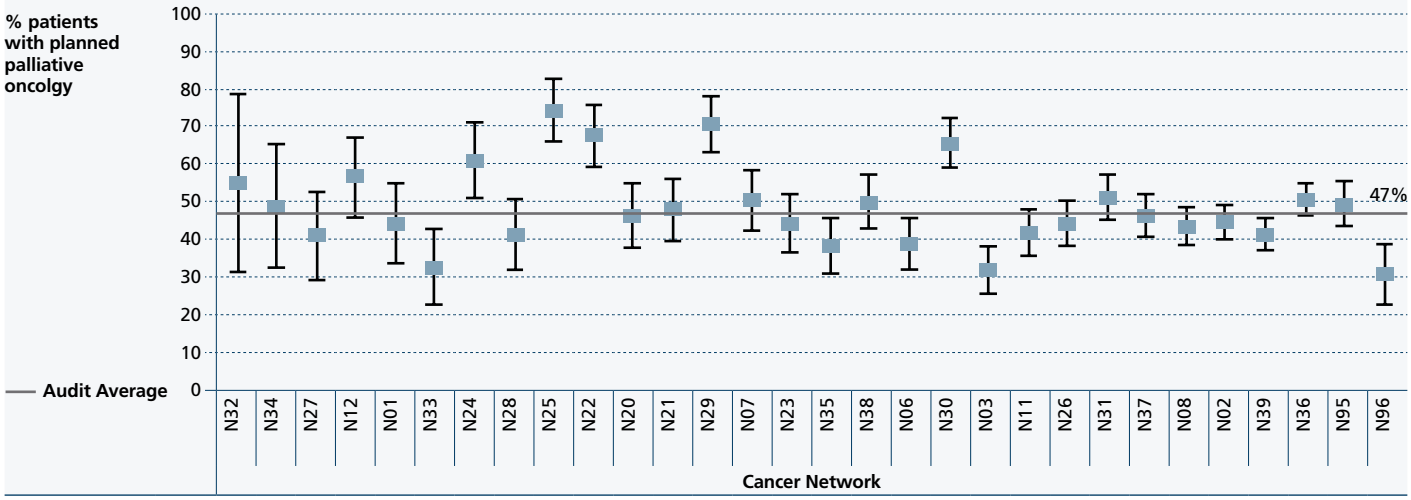
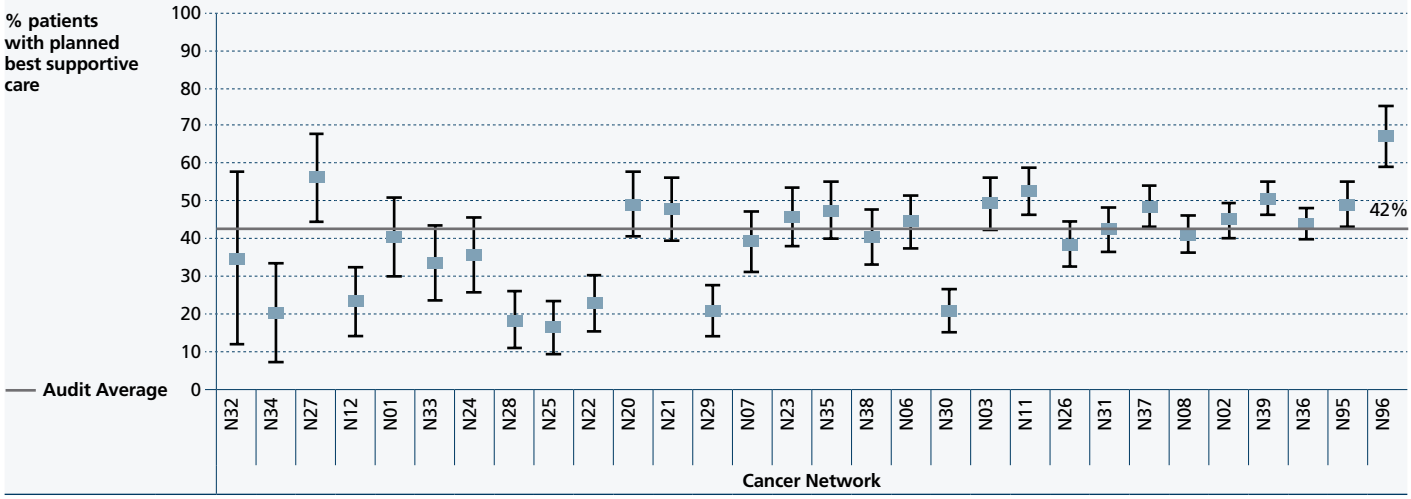


Figure 7.3
Proportion of palliative patients who were planned to receive best supportive care, by Cancer Network in England and Wales (ordered by increasing number of cases)



Since the first Audit there has been an increase in the number of patients managed with best supportive care. There has been a corresponding decline in use of endoscopic and radiological palliation (Table 7.6). This may reflect a change in how MDT discussions regarding planned management are documented or due to improved staging, but it will be interesting to monitor this trend in the future.

Table 7.6
Proportion of patients managed with palliative intent who received best supportive care

	Best Supportive Care	
	First Audit	Second Audit
Oesophageal SCC	22%	36%
Oesophageal ACA Mid/Upper	26%	40%
Oesophageal ACA Lower/SI	24%	36%
GOJ SII/III	28%	36%
Stomach	52%	55%

Conclusions on Planned Treatment

About 35 per cent patients are managed with curative intent, but for patients diagnosed as a result of emergency admission, this figure was only 14 per cent. There was considerable variation in the proportion considered for curative treatment across Networks, some of this variation may be due to low case-ascertainment.

Uptake of peri-operative oncological therapy has stabilised at 80 per cent for oesophageal cancer, while for locally advanced gastric cancer use continues to improve. This is important because its use provides a small but significant survival benefit and should be considered in patients with a good performance status.

Use of curative endoscopic therapy is rising rapidly for early O-G cancers. We expect this trend to continue as clinicians develop greater confidence in the use of endoscopic therapies for early cancers, providing long term data showing comparable survival to surgery.

There was significant variation in palliative approach chosen across Cancer Networks.

Comparison with First Audit

- No change in the proportion of patients managed with curative intent.
- Increase in the proportion of patients receiving definitive chemoradiotherapy for oesophageal SCC (up from 31 per cent to 38 per cent), with a corresponding decline in use of curative surgery (down from 17 per cent to 12 per cent).
- Use of peri-operative chemotherapy has increased for locally advanced gastric cancer from 55 per cent to 63 per cent. The rate of combined therapy for oesophageal cancer has remained stable.
- Significant increase in reported planned use of curative endoscopic therapy, from 0.8 per cent to 4.5 per cent.
- Increasing proportion of patients on palliative treatment intent managed with best supportive care for all cancer sites, with a reduction in use of endoscopic and radiological palliative approaches.

Comments from Dr Tom Crosby (Consultant Clinical Oncologist, Velindre Cancer Centre)

Outcomes from O-G cancer continue to improve, but we still face challenges in determining optimal treatment, in particular regarding specialist oncological treatment of this disease.

Definitive chemoradiotherapy (dCRT) is more effective than radiotherapy [Cooper 1999] or chemotherapy alone [Cunningham 2008]. It is increasingly being considered as a standard treatment for oesophageal squamous cell carcinoma (SCC), with evidence suggesting outcomes are similar to surgery. Evidence for use of dCRT for oesophageal adenocarcinomas is less strong, and its use restricted to those unsuitable for surgery.

Within the UK, encouraging outcomes for dCRT have been published in a multi-centre prospective trial (SCOPE 1) (http://gicasym.asco.org/content/105132-133).

This showed dCRT was associated with excellent outcomes: 56 per cent survival at 2 years, manageable toxicity (an outpatient based schedule with no treatment related deaths) and a reversible effect on quality of life. This was despite the relatively poor prognostic population: 38 per cent aged over 70 years, 62 per cent unsuitable for surgery (due to disease extent or comorbidities) and 60 per cent stage III.

Currently dCRT should be considered in two distinct scenarios. Firstly, in the curative treatment of oesophageal SCC, it is currently only used in 38 per cent of patients with significant variation in use across Cancer Networks. Secondly, dCRT should be considered for non-metastatic adenocarcinomas unsuitable for surgery, because it can provide worthwhile long term disease control and is superior to palliative chemotherapy or endoscopic stenting alone.

Therefore all patients with non-metastatic carcinoma of the oesophagus should see a clinical oncologist who specialises in the treatment of Upper GI Cancers, and research should be done to evaluate effect of case load in specialist oncology centres on outcomes.

Reference

Cooper JS, Guo MD, Herskovic A, Macdonald JS, MArtenson JA Jr, Al- Sarraf M, et al. Chemotherapy of locally advanced esophageal cancer: long term follow-up of a prospective randomized trial (RTOG 85-01). JAMA 1999; 281: 1623-7.

Cunningham D, Starling N, Rao S, Iveson T, Nicolson M, Coxon F, Middleton G, et al. Capecitabine and oxaliplatin for advanced esophagogastric cancer. N Engl J Med. 2008 Jan 3; 358(1):36-46.

8. Curative treatment patterns

The first Audit found that 36 per cent patients had treatment with curative intent, and most of these patients received surgery which was frequently combined with chemotherapy. Overtime the types of surgical procedures performed and the surgical approach used has changed, with increasing use of minimally invasive surgery. This chapter will explore further the curative treatments used, and in the next chapter we will explore the associated outcomes.

Curative Surgery

There are three main challenges in oesophago-gastric surgery: is there a reasonable chance of cure with an operation; is the patient fit enough to survive surgery; and, if so, what is the best operation to remove all known loco-regional cancer and give the patient a reasonable quality of life afterwards? None of these issues are straight forward. More recently, minimally invasive approaches for oesophageal and gastric resections have been introduced with the aim of improving morbidity and mortality, although a clear benefit with this approach is yet to be demonstrated in the literature. These areas are discussed further in Textbox 8.1.

Textbox 8.1
Surgical Procedures

Surgical Procedures

For oesophageal resections, there is no evidence favouring one method of oesophageal resection over another [Allum et al 2011], options include Ivor Lewis (two phase), McKeown (three phase), transhiatal, and left throaco-abdominal approaches. Transhiatal surgery is best suited for early stage disease but should also be considered in patients who would not withstand a thoracotomy.

For gastric resections, the type of surgery planned depends on the site of tumour and the extent of the planned lymphadenectomy. Depending on tumour site, current guidelines recommend the following surgical approaches: Subtotal gastrectomy for distal tumours, total gastrectomy for proximal tumours, and transhiatal extended total gastrectomy or oesophago-gastrectomy for tumours of the cardia/Siewert II tumours [Allum et al 2011].

Minimally Invasive (MI) Surgery: The Audit data suggests an increasing number of procedures are being performed using a minimally invasive (MI) technique. These procedures are performed using laparoscopic cameras inserted through several small (1-2cm) incisions, rather than using the large incision characteristic of open surgical procedures. A recent meta-analysis found that minimally invasive oesophagectomy was associated with lower blood loss, shorter hospital stay, reduced total morbidity but there was no significant difference in 30-day mortality [Nagpal et al 2010], while a Randomized Controlled Trial by Biere et al 2012 found that MI surgery was associated with lower rates of respiratory complications, and a better quality of life at 6 weeks compared to open surgery. Consequently, it appears that MI oesophagectomy is a safe alternative to open surgery, but further trials need to be done to compare the two. A similar MI approach can be taken for gastric surgery. Results are still inconclusive, although several meta-analyses suggest that MI distal gastrectomy is associated with shorter hospital stays and fewer post-operative complications [Vinuela 2012, Zorcolo 2011, Ohtani 2011].

Hybrid Operations: Fully minimally invasive oesophagectomies involve both a thoracoscopy for the chest-phase of the operation and a laparoscopy for the abdominal phase. However oesophagectomies can be performed using minimally invasive techniques for only abdominal or chest phase. These are commonly referred to as hybrid operations.

Audit Findings

Patient Characteristics

Surgical records were submitted for 2,343 patients with O-G cancer diagnosed between 1 April 2011 and 31 March 2012. Where surgical intent and procedure was known, 2,063 patients had surgery with pre-operative curative intent and a further 100 patients underwent surgery with palliative intent.

We analysed the characteristics of patients who underwent an oesophagectomy or gastrectomy with curative intent (Table 8.1), looking at variations in patient characteristics according to planned treatment modality.

Patients undergoing surgery with curative intent were younger and fitter than the overall group, as expected. It is interesting to note that 8 per cent of procedures were done on patients aged 80 over: 35 had oesophagectomies and 113 had gastrectomies.

Curative Surgical Procedures Performed

1,220 oesophagectomies and 747 gastrectomies were performed with curative intent. Further analysis was done looking at the types of procedures performed (Table 8.2). 97 per cent of oesophagectomies were performed via the transthoracic approach, with the two phase Ivor Lewis procedure being the most popular and only 42 procedures done via transhiatal approach. As expected for gastric resections, most procedures were total or distal gastrectomies. The rate of open-shut procedures was unchanged from the last Audit, at 4 per cent of all procedures done with curative intent.

Table 8.1
Summary of characteristics of patients who had a planned curative oesophagectomy or gastrectomy, analysed according to planned treatment modality

		Type of Operation	
		Oesophagectomy (n=1,220)*	Gastrectomy (n=747)*
Patient Characteristics: Surgery only			
Number of patients		**276**	**344**
Patient age (years)	Median	69	76
	Inter Quartile Range	61 to 75	70 to 80
Performance Status	0 or 1	84%	78%
ASA Grade	I or II	71%	61%
Patient Characteristics: Surgery and chemotherapy or chemoradiotherapy			
Number of patients		**904**	**369**
Patient age (years)	Median	65	67
	Inter Quartile Range	59 to 70	60 to 73
Performance Status	0 or 1	93%	93%
ASA Grade	I or II	80%	77%

* For some patients, information on treatment planning and procedures were missing. Therefore, the numbers reported by treatment modality differ from the total number of procedures.

Table 8.2
Surgical procedures performed where pre-operative intent was curative, by type and site of tumour

Type of Operation	Oesophageal SCC	Oesophageal ACA Mid/Upper	Oesophageal ACA Lower/SI	GOJ SII/SIII	Stomach	Total
Oesophagectomy (n=1,220)						
Left Thor-abdominal	33	15	97	28	0	**173**
2-Phase (Ivor Lewis)	155	59	580	163	0	**957**
3-Phase (McKeown)	17	10	15	6	0	**48**
Transhiatal	7	2	24	9	0	**42**
Gastrectomy (n=747)						
Total	1	0	21	79	254	**355**
Extended Total	1	0	7	25	17	**50**
Proximal	1	0	0	2	15	**18**
Distal	1	0	0	0	297	**298**
Other	0	0	1	0	25	**26**
Other Procedure						
Open-Shut	12	1	26	20	26	**85**
Bypass	0	0	0	0	11	**11**
Total	**228**	**87**	**771**	**332**	**645**	**2,063**

The use of minimally invasive (MI) surgical techniques in oesophago-gastric surgery is increasing. Operations may be fully MI or use a combination of open and MI surgery (hybrid). We therefore analysed the use of these techniques where the surgical intent was curative (Table 8.3). For oesophagectomies 15 per cent were fully MI and a further 28 per cent were hybrid operations. This has significantly increased from the last Audit when only 33 per cent of procedures where MI or hybrid.

For gastrectomies there was a smaller increase in use of MI approach from 13 per cent to 18 per cent, mainly for subtotal/partial resections. Intra-operative conversion rates from MI/hybrid surgery to open surgery were 11 per cent for oesophagectomies, and 15 per cent for gastrectomies. Oesophagectomy conversion rates in the previous Audit were 8 per cent.

Table 8.3
Surgical approach used for curative surgical resections, by type of procedure

Oesophagectomy					
	Left Thor-abdominal	**2-Phase**	**3-Phase**	**Transhiatal**	**Overall**
Open	167	428	14	39	**648**
Hybrid (includes converted)	2	314	5	0	**321**
Minimally invasive (MI) (includes converted)	4	140	24	3	**171**
Total	**173**	**882**	**43**	**42**	**1,140**
Percentage MI/hybrid	**3.5%**	**51.5%**	**67.4%**	**7.1%**	**43.2%**
Data Incomplete	**0**	**75**	**5**	**0**	**80**
		957	48	42	**1,220**

Gastrectomy			
	Total/Extended total	**Subtotal/partial**	**Overall**
Open	352	262	**614**
Minimally invasive (MI) (includes converted)	53	80	**133**
Total	**405**	**342**	**747**
Percentage MI	**13.1%**	**23.4%**	**17.8%**
Data Incomplete	**0**	**0**	**0**

Very few patients had another organ removed during their primary resection. A splenectomy was performed for 7 patients (0.6 per cent) who had an oesophagectomy and 18 patients (2.4 per cent) who had a gastrectomy. There were also only 4 pancreatic resections and 4 liver resections.

Use of oncological therapy with curative intent

Neoadjuvant/adjuvant therapy

Neoadjuvant and peri-operative chemotherapy offers survival benefit compared to surgery alone for locally advanced oesophageal and gastric cancers [Allum et al 2011].

Audit Findings

The use of neoadjuvant (pre-operative) oncology alone seems to have dropped slightly since the last Audit, but there has been a corresponding rise in use of combination neoadjuvant and adjuvant (peri-operative) therapy and very few patients receiving only adjuvant (post-operative) (Table 8.4).

Patients undergoing neoadjuvant chemotherapy were generally younger and fitter. This may correlate with good clinical judgement, with patients selected based on their ability to cope with the physiological insult of both treatments.

The completion rates for neoadjuvant chemotherapy were good with 79 per cent patients completing planned treatment. Where treatment was not completed, the most common reasons for failure were chemotherapy toxicity in 46 per cent and disease progression in 24 per cent.

Where patients received definitive oncological treatment, this was nearly always combined chemoradiotherapy in preference to either modality alone. Overall, 75 per cent patients completed their planned treatment, and where treatment was not completed the most common reason for failure was chemotherapy toxicity (60 per cent).

Conclusions on curative treatment patterns

1,220 oesophagectomies and 747 gastrectomies were performed with curative intent. Patients planned to have oncological therapy in addition to planned curative surgery were generally younger and fitter as expected.

In terms of surgical approach for oesophagectomies, Ivor Lewis procedure was the preferred approach, with the transhiatal approach rarely being used. The use of minimally invasive oesophageal surgery (fully MI and hybrid) has increased. For gastrectomies, nearly all procedures were total or distal gastrectomies, and there was a slight increase in the use of MI surgery.

Use of oncological therapy has altered slightly since the first Audit, with nearly all patients who received chemotherapy receiving neoadjuvant therapy and increased use of adjuvant chemotherapy as well.

Overall neoadjuvant chemotherapy appears to be well tolerated, with the main reason for patients not completing planned treatment being chemotherapy toxicity.

Comparison with First Audit

- Patients undergoing curative oesophagectomies and gastrectomies were slightly older on average, with slightly worse ASA grade and performance status than the first Audit.
- Use of MI/hybrid techniques had increased for oesophagectomies, increasing from 33 per cent in the first Audit to 43 per cent. While for gastrectomies there has been a smaller increase in use of MI surgery from 13 per cent to 18 per cent.
- An increased proportion of patients received peri-operative chemotherapy instead of just preoperative therapy, up from about 6 per cent to 10 per cent.

Table 8.4
Summary of oncological treatment undergone by patients planned to have curative surgery

Treatment Intent	Oesophageal SCC	Oesophageal ACA Upper/Mid	Oesophageal ACA Lower/SI	GOJ SII/SIII	Stomach	Total
Number of Patients	214	66	693	286	366	**1,625**
Neoadjuvant only	91%	88%	89%	84%	77%	**86%**
Adjuvant only	2%	6%	3%	2%	11%	**5%**
Neoadjuvant and adjuvant	8%	6%	8%	14%	12%	**10%**

9. Outcomes of curative surgery

In this chapter, we aim to review the outcomes of oesophagectomies and gastrectomies done with curative intent in terms of both complication rates and effectiveness of surgery at achieving clear resection margins and adequate numbers of lymph nodes for staging.

Complication Rates

The Audit collected data on the rates of various complications from surgery, and this was combined with HES data. Postoperative mortality remains the major risk with these procedures. We therefore linked the Audit data to ONS date of death to assess mortality rates at particular time intervals after surgery.

The first Audit found that peri-operative outcomes for different surgical approaches and for open versus minimally invasive (MI) procedures were broadly similar, although the anastomotic leak rate was higher after MI oesophagectomy compared to open. At the time of the first Audit, MI/hybrid surgery was a relatively new technique being introduced cautiously. Therefore, this chapter aims to look at the effect changes in surgical technique have had on outcomes.

The most recent NICE guidelines on MI oesophagectomy recognized that it is a technically challenging procedure, which should only be carried out by surgeons with special expertise and specific training. They recommended that initial operations should be carried out with an experienced mentor. AUGIS recommended that minimally invasive surgery should be introduced cautiously, and it should only be performed in cancer centres by teams confident in their outcomes for MI surgery [Hardwick et al 2008]. Results from well-designed randomised controlled trials (RCTs) are still needed to demonstrate the safety, efficacy and cost effectiveness of MI surgery compared to open surgery.

Effectiveness of surgery

Lymph node resection

Adequate lymph node dissection is required for the Union of International Cancer Control (UICC) staging of O-G cancer to determine if further oncological treatment is required after surgery and to allow accurate staging. Types of lymph node resection are discussed further in Textbox 9.1.

Textbox 9.1
Approaches to lymphadenectomy

Lymphadenectomy:

Oesophageal cancer

Optimal lymph node yield is controversial, but increased lymph yield increases the chance of detecting any nodal metastases and reduces the risk of loco-regional tumour recurrence.

Gastric cancer

At least 15 nodes are required for accurate staging. Lymphadenectomies at gastrectomy are divided up based on extent of resection:

- D1 removal of first tier of peri-gastric lymph nodes.
- D2 removal of first and second tier of peri-gastric lymph nodes.

Oesophageal cancer

Initial studies have suggested that lymph node yield from MI surgery are similar to those with open approach for oesophageal cancer [Palaniveluet al 2006]. This finding was corroborated in the first Audit.

Gastric cancer

More extensive lymphadenectomy may increase operation related risks but allows more accurate staging and may remove local nodal disease. Initial studies have suggested that D2 lymphadenectomy can be safely performed laparoscopically [Tanimura et al 2007]. To date, RCTs done in the West have found little initial difference in outcome for D1 versus D2 lymphadenectomy [Bonenkamp et al 1999, Cuschieri et al 1996] and the effect on long term cancer related survival is debated [Cuschieri et al 1999]. A recent trial showed long term cancer related survival appeared to be better after D2 resection [Songun et al 2010].

Resection Margins

For all curative O-G cancer surgery, the aim is to achieve tumour free resection margins (R0) because patients are rarely cured if there is evidence of tumour at the longitudinal margin. Guidelines suggest that hospitals monitor this standard locally. Assessment of the circumferential margin after oesophagectomy is more difficult, as false positive results can occur if lymph nodes are removed from the resection specimen prior to fixation. For oesophago-gastric cancer surgery, longitudinal margin status (proximal and distal) is very important and is, to a large extent, under the control of the surgeon and can be used as an indicator of surgical performance.

Audit Findings

Post-operative Outcomes

Postoperative Mortality

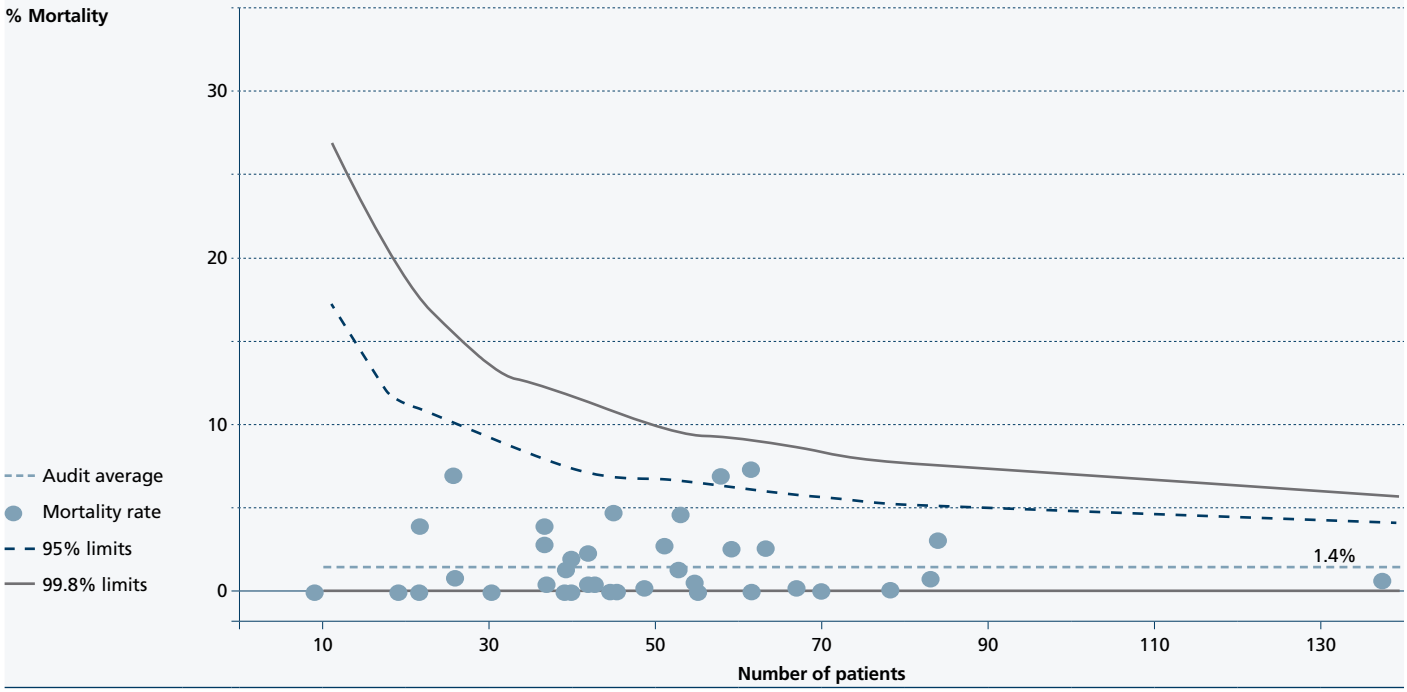
Results from this Audit suggest that overall in-hospital, 30 day and 90 day mortality rates have all fallen since the first Audit, with results from this Audit summarised in Table 9.1. Total 30 and 90 day mortality for oesophagectomies and gastrectomies combined is 1.4 per cent and 3.1 per cent, respectively. Subgroup analysis found no significant difference in mortality depending on whether the procedure was open or MI.

The 30 day and 90 day mortality rates were explored at trust level, and outcomes are shown in funnel plots after adjusting for age, sex, performance status, comorbidities, TNM stage, ASA grade and type of procedure (Figures 9.1 and 9.2). These show there was no significant difference in rates at trust level.

Table 9.1
Unadjusted postoperative mortality for curative surgery, by type of procedure

	Oesophagectomy (n=1,220)		Gastrectomy (n=747)	
	Rate (%)	95% CI	Rate (%)	95% CI
In-hospital mortality	2.9	1.9-3.9	2.2	1.3-3.6
30 day mortality	1.7	1.0-2.5	1.1	0.5-2.1
90 day mortality	3.2	2.2-4.2	2.8	1.7-4.3

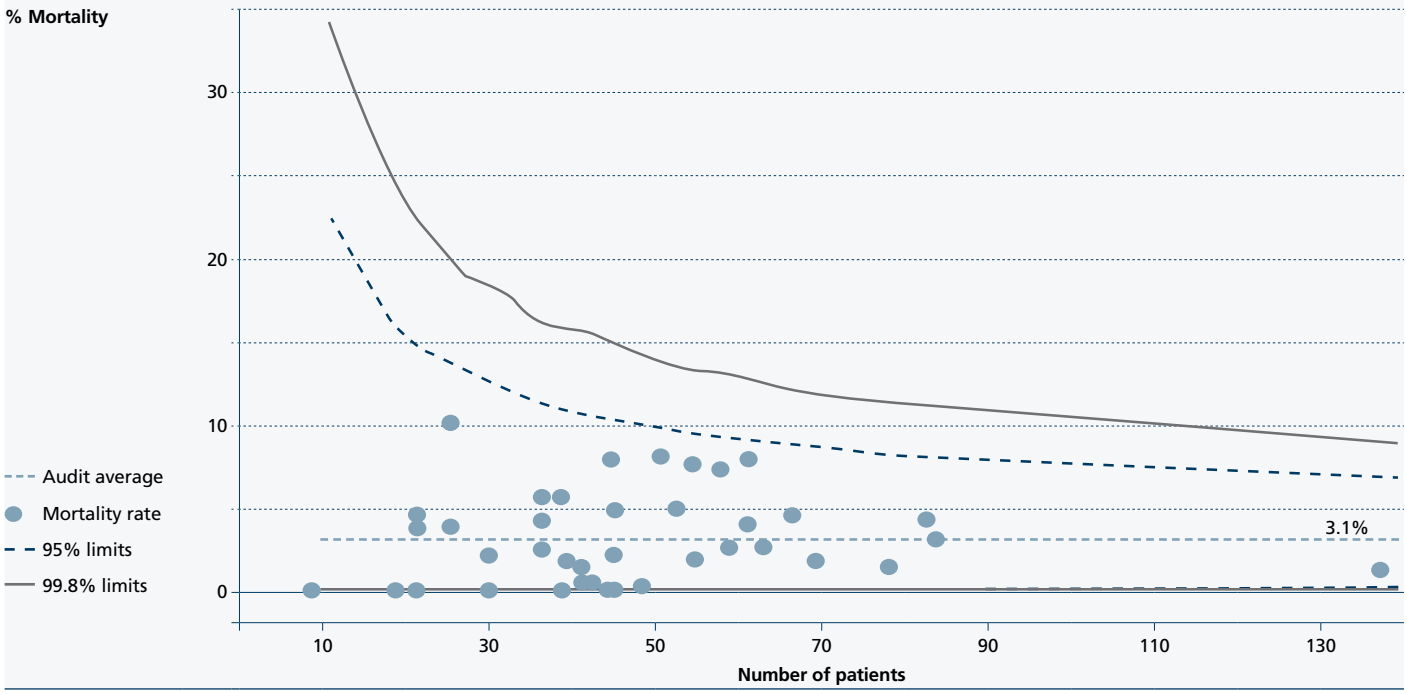
Figure 9.1
Funnel plot showing adjusted 30 day mortality by trust, for oesophagectomies and gastrectomies combined



Note: The overall volume of procedures based on one year of Audit data is small and postoperative mortality is low, therefore, the power to detect true outliers is limited. While the funnel plots depict some variability, this is not more than would be expected by chance alone.

Results reported at NHS trust level should not be considered as evidence of poor practice, but rather as indicators to direct further local enquiry into the quality of care. NHS trusts with less than 10 cases were excluded from the analysis.

Figure 9.2
Funnel plot showing adjusted 90 day mortality by trust, for oesophagectomies and gastrectomies combined



Note: The overall volume of procedures based on one year of Audit data is small and postoperative mortality is low, therefore, the power to detect true outliers is limited. While the funnel plots depict some variability, this is not more than would be expected by chance alone. Results reported at NHS trust level should not be considered as evidence of poor practice, but rather as indicators to direct further local enquiry into the quality of care. NHS trusts with less than 10 cases were excluded from the analysis.

Inpatient Postoperative complications

For oesophagectomies, the overall complication rate has not changed significantly since the first Audit, with 30 per cent of all patients having a post-operative complication. Further analysis of specific complication rates are shown in Tables 9.2 and 9.3. The most common complication after oesophagectomy was respiratory, affecting 16.2 per cent (an increase from 12.9 per cent in the first Audit). This increase may be due to chance, or due to the particularly high rate of respiratory complication with hybrid operations. This rate should be monitored closely in the future.

For gastrectomies, the overall complication rate appears to have fallen from 19 per cent in the first Audit to 15 per cent. Patients having a gastrectomy had a lower rate for all the specific complications compared to patients having an oesophagectomy.

For both oesophageal and gastric surgery, whether the operation was done via an open or MI approach did not significantly affect the complication rate, except for a potentially higher rate of respiratory complications after hybrid oesophagectomies.

At this time there was no difference in specific complication rates for MI surgery compared to the first Audit. But it is important to keep an eye on these results over time and hospitals should be encouraged to monitor their outcomes prospectively, as a greater proportion of procedures appear to be being done using a MI or hybrid approach. Our findings should be interpreted cautiously as they only represent a snapshot of results, and we have no information on surgeons training and details of technique used. Therefore the results should not be used for comparative evaluation of the two techniques.

Table 9.2
Unadjusted rates of inpatient complications after curative oesophagectomy, by surgical approach

Complication	Open (n=647)		Hybrid (n=321)		Minimally Invasive (n=171)		Overall[1] (n=1,220)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
Any Complication	32.3	28.7-36.1	31.8	26.7-37.2	27.5	20.9-34.8	29.7	27.1-32.2
Anastomotic Leak	7.9	5.9-10.2	6.9	4.3-10.2	8.8	5.0-14.1	7.4	5.9-8.9
Chyle Leak	3.2	2.0-4.9	4.0	2.2-6.8	5.8	2.8-10.5	3.6	2.6-4.7
Cardiac	7.4	5.5-9.7	4.4	2.4-7.2	4.7	2.0-9.0	5.8	4.5-7.1
Wound	3.6	2.3-5.3	3.4	1.7-6.0	1.8	0.4-5.0	3.0	2.1-4.0
Respiratory	16.8	14.0-20.0	21.8	17.4-26.7	10.5	6.4-16.1	16.2	14.2-18.3
Re-Operation	8.7	6.5-11.2	9.6	6.6-13.4	9.8	5.6-15.7	8.9	7.2-10.5

[1] Surgical approach was not documented for 81 oesophagectomies.

Table 9.3
Unadjusted rates of inpatient complications after curative gastrectomy, by surgical approach

Complication	Open (n=614)		Minimally Invasive (n=133)		Overall (n=747)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
Any Complication	14.8	12.1-17.9	14.3	8.8-21.4	14.7	12.3-17.5
Anastomotic Leak	4.4	2.9-6.3	4.5	1.7-9.6	4.4	3.1-6.1
Chyle Leak	0.5	0.1-1.4	0.8	0.0-4.1	0.5	0.1-1.4
Cardiac	2.1	1.1-3.6	3.0	0.8-7.5	2.3	1.3-3.6
Wound	2.1	1.1-3.6	2.3	0.5-6.5	2.1	1.2-3.5
Respiratory	8.1	6.1-10.6	6.0	2.6-11.5	7.8	5.9-9.9
Re-Operation	7.2	5.2-9.7	12.3	7.0-19.5	8.1	6.2-10.5

It was noted that patients who suffer an anastomotic leak were at particular risk of other complications, see Table 9.4. They also had a significantly higher 30-day post-operative mortality.

Table 9.4
Rates of complications in patients who had planned curative surgery, comparing those who suffered an anastomotic leak with those who did not

Complication	% patients without leak (n=1982)	% patients with leak (n=125)	Adjusted Odds Ratio[1]	95% CI	P Value
In-Hospital Mortality	1.9	12.1	5.7	2.5-13.1	<0.001
30-Day Mortality	1.2	6.4	2.7	0.7-9.7	0.015
90-Day Mortality	3.1	10.4	2.5	1.0-5.8	<0.001
Re-operation	5.9	42.3	10.5	6.6-16.8	<0.001
Respiratory	11.0	31.2	3.3	2.1-5.2	<0.001
Cardiac	4.1	9.6	2.3	1.1-4.9	0.002
Wound infection	2.4	8.9	2.6	1.1-6.5	0.123

[1] Odds ratio adjusted for age, sex, ASA grade, performance status.

Length of stay

Median length of stay was longer for oesophagectomy compared to gastrectomy, with 13 and 11 days from admission for surgery to discharge, for patients discharged alive (Tables 9.5 and 9.6). Median length of stay was slightly shorter for procedures using a minimally invasive approach.

Table 9.5
Length of stay (in days) after oesophagectomy by approach (n=1219)

	Median	25 percentile	75 percentile	IQR
Open	14	10	21	11
Hybrid	13	10	18	8
Minimally invasive	12	9	17	8
Unknown	13	11	20	9
Total	**13**	**10**	**20**	**10**

Table 9.6
Length of stay (in days) after gastrectomy by approach (n=747)

	Median	25 percentile	75 percentile	IQR
Open	11	8	15	7
Minimally invasive	10	7	15	8
Total	**11**	**8**	**15**	**7**

Efficacy of Surgery

Nodal dissection

The lymph node yield for oesophagectomies and gastrectomies are shown in Tables 9.7 and 9.8. Note that for some procedures where lymph node yield was recorded the surgical approach is unknown, so these additional cases are included in the overall results.

Gastric cancer results were similar to the first Audit, with only 76 per cent of curative gastrectomies having 15 or more nodes resected.

Table 9.7
Nodal yield for curative oesophagectomy comparing open, hybrid and MI procedures (n=1139)

	Number of nodes examined				
	1-5	6-14	15 or more	Total	Missing
Open	2.9%	19.2%	77.9%	647	58
Hybrid	1.7%	14.6%	83.7%	321	26
MI	2.5%	12.3%	85.3%	171	8
Overall	**2.4%**	**10.7%**	**81.1%**	**1139**	**95**

Table 9.8
Nodal yield for curative gastrectomy comparing open to MI procedures (n=747)

	Number of nodes examined				
	1-14	15-24	25 or more	Total	Missing
Open	24.1%	32.2%	43.8%	614	86
MI	26.2%	30.8%	43.0%	133	26
Overall	**24.4%**	**32.0%**	**43.6%**	**747**	**112**

Resection margin

Overall results were similar to the first Audit. About 4 per cent patients (1 in 24) who had an oesophagectomy had a positive longitudinal resection margin. For gastrectomies, 9 per cent (1 in 11) had a positive longitudinal resection margin (Table 9.9).

Table 9.9
Percentage of patients with positive resection margins

	Oesophagectomy			Gastrectomy		
	n	Overall %	95% CI	n	Overall %	95% CI
Positive overall longitudinal resection margin	1033	4.1%	2.9-5.4%	628	9.4%	7.1-11.7%
Positive circumferential margin	950	27.0%	24.1-29.9%	380	8.4%	5.6-11.2%

Conclusions on curative treatment outcomes

The data reported here suggests a marked improvement in mortality after curative gastrectomy since the first Audit. There was no significant difference in mortality rates depending on whether open or MI technique used.

1 in 3 oesophagectomy and 1 in 7 gastrectomy patients suffered from a complication, but rates were not significantly different depending on whether open or MI surgery technique, except for respiratory complications which appeared to be higher after hybrid oesophagectomies but lower for fully MI procedures. Patients who suffered an anastomotic leak were at particularly high risk of other complications and this adversely affected their mortality.

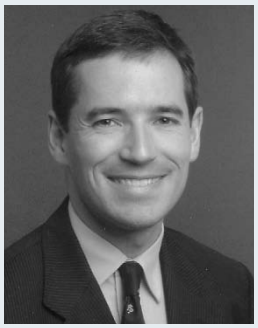
Since the first Audit, lymph node yields after oesophagectomy have increased but stayed the same after gastrectomy. Achieving an R0 resection remains a challenge with 9 per cent of gastrectomy specimens having histologically detected tumour at their longitudinal margins.

Table 9.10
Comparison of post-operative mortality figures from First and Second Audit

	Oesophagectomy		Gastrectomy	
	First Audit	Second Audit	First Audit	Second Audit
In-Hospital mortality	4.5%	2.9%	6.0%	2.2%
30 day mortality	3.8%	1.7%	4.5%	1.1%
90 day mortality	5.7%	3.2%	6.9%	2.8%

Comparison with First Audit

- Overall mortality associated with both oesophagectomies and gastrectomies has improved since the first Audit (Table 9.10).
- Overall complication rates for oesophagectomies remain unchanged, but the proportion of patients having any complication after gastrectomy has fallen from 19 per cent to 15 per cent.
- Specific complication rates are relatively unchanged since the first Audit but it is encouraging to note that leak rate associated with MI oesophagectomy appears to have fallen slightly.
- There has been an increase in the proportion of patients who had >6 lymph nodes resected at curative oesophagectomy, but for gastric cancer the lymph node yield remains unchanged.
- Proportion of patients with positive longitudinal resection margins is unchanged.



Comment from Mr Richard H Hardwick (Consultant Surgeon, Addenbrookes Hospital)

Centralisation of oesophageal and gastric cancer surgery in England and Wales has been challenging, but we are now seeing the rewards. This Audit report shows how specialist teams working in high-volume cancer centres have reduced the postoperative (in-hospital) mortality rate of these notoriously morbid operations to 2.5 per cent. These excellent results reflect the dedication and professionalism of everyone involved, not just the consultant surgeons. I would urge the reader to remember this when looking at the consultant-level data to be published by the end of June 2013. Now that mortality is becoming a rare event after upper gastro-intestinal cancer surgery we need to focus on different indicators of success; there is potentially plenty we can do to improve patient outcomes.

Complication rates remain stubbornly high. There are obvious reasons for this; our patients are generally elderly and unfit, and the surgical insult we submit them to is significant.

We must challenge the notion that nothing can be done to change this. Can we prepare them better for surgery (pre-optimise) and smooth their post-operative journey to discharge (enhanced recovery)? Does minimally invasive surgery improve outcomes or is it just a technical tours de force with no real benefit? Any operation performed for cancer with curative intent must aim to remove all the primary cancer (R0). Finding microscopic tumour at a longitudinal resection margin (R1) reduces the chance of a cure. 9 per cent of gastrectomy patients in this Audit had such an outcome; how can we reduce this figure? Anastomotic leakage affects around 8 per cent of oesophagectomy and 4 per cent of gastrectomy patients and is associated with poor outcomes. Techniques for reconstituting the gastro-intestinal tract after resectional surgery traditionally remain the surgeon's prerogative; should we challenge this and introduce more conformity?

The multi-disciplinary surgical teams who have contributed to this report have very low postoperative mortality rates and should be congratulated accordingly. Performing complex surgery safely involves many individuals, all of whom make a unique contribution to the successful outcome for an individual patient. I hope this Audit report helps reassure the public how seriously we take patient safety. However, we must not be complacent and need now to focus our attention on reducing complications, increasing R0 resection rates and helping our patients return to a good quality of life more quickly after surgery.

10. Palliative treatment patterns and outcomes

Most patients diagnosed with O-G cancer are not amenable to potentially curative therapy, so careful consideration needs to go into optimal choice for palliative treatment. The goals of palliative therapy are symptom control (e.g. relief of dysphagia), improving survival, and improving quality of life.

Palliation Options

Palliative Oncology

Palliative chemotherapy should only be considered where the patient has a good performance status.

Endoscopic and Radiological palliative therapy

Endoscopic therapy is used primarily for symptom relief for oesophageal cancers and GOJ tumours.

Oesophageal stents

The most common endoluminal palliative procedure performed is insertion of a self-expanding stent, which can be performed endoscopically or radiologically. A large variety of different stents are available, which can be classified as follows:

- **Self-expanding metal stents** (SEMS): These may be woven from metal wires or cut from solid tubes. These stents can be completely or partially covered in a membrane, with the aim of reducing tumour ingrowth and hence re-intervention rate. Partially covered stents have uncovered ends to allow better anchoring of the stent, but most stents are fully covered to allow removal in case of complications. The commonest complication of fully covered stents is migration, occurring in 5-6 per cent stents placed in the mid-oesophagus and in over 16 per cent of stents placed across the GOJ.
- **Self-expanding plastic stents (SEPS)**: Have been shown to be safe and effective in oesophageal cancer, but studies suggest a higher rate of complications, notably stent migration.
- **Biodegradable (BD) Stents**: These can be made from a resorbable suture material (polydioxanone), which disintegrates over 3-4 months. At present they are only licensed in benign disease, but a number of centres have started to use BD stents for temporary stenting while awaiting the results from neo-adjuvant, radical or palliative chemo- and/or radiotherapy. This use is currently off-label, although the licensing may be expanded in the future.
- **Anti-reflux stents**: Stents placed across the GOJ predispose to regurgitation of gastric content, which can be associated with aspiration pneumonia and death in isolated cases. Studies suggest that use of stents containing an anti-reflux valve are at least as efficient as proton pump inhibitor therapy without the additional medication burden for a dysphagic patient, but their use is not universally accepted.

Brachytherapy

Brachytherapy is a form of internal radiotherapy and has been shown to be an effective alternative to SEMS [Homs 2004]. In the longer term, it may be associated with better relief of dysphagia and fewer complications than SEMS, but in the short term relief of symptoms is slower than after stent insertion. Consequently, brachytherapy should be considered in patients with an expected survival of more than three months.

Currently brachytherapy is not widely available in the UK, with only 54 per cent Cancer Networks reporting access to it compared to 100 per cent for stenting in the last NOGCA organisational survey 2012.

Textbox 10.1
Palliative Treatment Options

Palliative chemotherapy can improve survival in locally advanced gastric cancer by 3-6 months, compared to best supportive care alone. Similar results are seen in oesophageal cancer.

External beam radiotherapy can be used to treat dysphagia with few side effects, but benefit is comparatively slow to achieve compared to stenting.

Brachytherapy can be used to treat dysphagia with few adverse effects, and should be considered if life expectancy is more than 3 months.

Endoscopic therapy

- Stenting provides rapid relief of dysphagia in a one-stage procedure; useful if life expectancy short.
- Laser therapy and argon plasma coagulation (APC) can both be used to relieve dysphagia due to tumours of oesophagus and GOJ and are particularly useful for treating tumour ingrowth above and below a stent. However, both techniques require multiple sessions and can be poorly tolerated.

Audit Findings

Palliative non-surgical oncology

Overall 2,706 patients were planned to have palliative oncology, of these 2,124 (78 per cent) had a corresponding oncology record entered. A further 92 patients, whose planned modality was palliative surgery or endoscopic/radiological palliation, received oncological therapy.

Among patients who received palliative oncology, palliative chemotherapy was the most common treatment received (in 64 per cent cases), while radiotherapy alone was received by 29 per cent. The rest received combined therapy. The use of these various palliative modalities according to tumour site is shown in Table 10.1. This shows that the use of palliative radiotherapy alone is highest for oesophageal SCC and lowest for gastric adenocarcinoma.

Patients receiving palliative chemotherapy or chemoradiotherapy were younger than those receiving just radiotherapy (mean age 65 vs 76 years). These differences were the same across all five tumour groups.

Completion rates

Palliative radiotherapy was generally very well tolerated with 93 per cent of patients completing their planned treatment course, but palliative chemotherapy was less well tolerated, with only half of patients completing their planned treatment course (Table 10.2). Although it should be noted that completion rates for these two approaches will naturally differ, as radiotherapy is completed in days while chemotherapy may take months.

Table 10.1
Palliative treatment modality for patients undergoing palliative oncological therapy, according to tumour site

Palliative Modality	Oes SCC	Upper/Mid ACA	Lower/SI ACA	GOJ SII/SIII	Stomach	Overall
Chemotherapy	44%	56%	64%	73%	80%	**64%**
Radiotherapy	46%	35%	28%	23%	16%	**29%**
Chemoradiotherapy	10%	9%	8%	5%	4%	**7%**
Number of patients	**517**	**129**	**737**	**309**	**521**	**2,216**

Table 10.2
Outcomes of palliative oncology treatments

Treatment Outcome	Chemotherapy	Radiotherapy
Treatment completed as prescribed	50.3%	92.6%
Patient died during treatment	11.8%	4.3%
Progressive disease during treatment	18.0%	0.8%
Acute chemo/radiotherapy toxicity	12.5%	0.5%
Stopped due to patient choice	7.5%	1.8%
Number of patients	**1,499**	**756**
Missing values	**425**	**134**

Overall patients who were older and had a poorer performance status were consistently less likely to complete their planned course of chemotherapy (Table 10.3).

Table 10.3
Proportion of patients who completed palliative chemotherapy, by age and performance status

Age Group (years)	Performance status			
	0 (n=1,084)	1 (n=864)	2 (n=248)	3/4 (n=47)
Under 60	74%	66%	48%	33%
60 to 70	75%	60%	40%	43%
70 to 80	71%	58%	54%	33%
Over 80	50%	60%	44%	0%

Endoscopic and Radiological palliative therapy

Patterns of endoscopic/radiological palliative treatment

Overall 1,680 patients were recorded as having endoscopic/radiological palliative therapy. Unfortunately data submission for the endoscopy dataset was poor, with 17 trusts not contributing treatment records.

Overall 91 per cent of patients in this group had a stent inserted, with most of these being inserted for oesophageal or junctional tumours (Table 10.4). But there was no recorded use of argon plasma coagulation (APC), and only two cases of photodynamic therapy recorded. Laser therapy was only used in 10 Networks, with 40 per cent of cases being recorded in a single Network.

Table 10.4
Number of endoscopic palliative therapeutic procedures, by tumour type

Procedure type	Oes SCC	Upper/Mid ACA	Lower/SI ACA	GOJ SII/SIII	Stomach	Overall
Stent Insertion	489	153	576	133	170	**1,521**
Laser Ablation	7	4	18	1	5	**35**
Brachytherapy	14	1	11	1	0	**27**
Dilatation	35	7	28	8	1	**79**
Gastrostomy	5	0	2	1	0	**8**
Other	6	1	17	1	11	**18**

The uptake of brachytherapy is still relatively low. Despite 15 Cancer Networks reporting having access to it, only 4 Cancer Networks reported using it (Mount Vernon, Peninsula, North of England and East Midlands).

Endoscopic dilatation alone is generally not recommended, with the SIGN guidelines 2006 stating this 'should be avoided due to the transient nature of the symptom improvement it provides'. But more recent BSG guidelines suggest that post radiotherapy strictures can be effectively dilated with fewer complications than stent insertion [Allum 2011]. Overall 56 patients were treated with dilatation as their only endoscopic therapy, of these 18 had a record of receiving radiotherapy and so dilatation in these cases was potentially treating a radiotherapy stricture.

Stenting procedures and complications

Stenting was the most common approach to endoscopic/radiological palliation. Generally patients undergoing this procedure were old and frail, their median age was 77 years and 55 per cent had a performance status of 2 or more.

Overall stent insertion was very successful with 98 per cent of stents successfully deployed. Most stents were used to treat oesophageal tumours (n=1,351), with only 170 inserted for gastric tumours.

Details of stent procedures are shown in Table 10.5. 79 per cent of stents inserted were covered metal stents, with similar rates for oesophageal/GOJ cancers. But for stomach cancers only 60.6 per cent were covered stents and 32.7 per cent were uncovered, this may be due to the fact that in the past studies have suggested using uncovered stents at the cardia to try to reduce the risk of distal migration [Sabharwal et al 2013].

The approach used to guide stent placement has changed since the first Audit with a greater proportion of stents now being placed using a combined fluoroscopic and endoscopic approach (45 per cent vs 36 per cent) or just endoscopic approach (34 per cent vs 23 per cent), with a corresponding decline in placement under just fluoroscopy (41 per cent to 21 per cent). Approach did not vary across tumour sites except for higher rates of combined approach for stomach cancer. The BSG guidelines in 2004 [Riley et al 2004] noted that fluoroscopy may be helpful when the stricture is tortuous or complex, and can provide reassurance when the guidewire meets resistance during passage through the stricture. While the NCEPOD report 'Scoping our practice' (2004) recommended the use of fluoroscopy for stent placement, and felt that not using it was unwise. A recent retrospective study suggested that there was no difference in complication rate according to approach [Ferreira et al 2012]. Currently reported practice varies widely across NHS trusts, but there was no association between method of stent placement and occurrence of complications.

After stent insertion 57 per cent of patients survived more than 3 months, which concurs with the findings of the Registry of Oesophageal Stenting 2004 which found that median survival after stenting was 92 days. These patients may have been suitable for brachytherapy instead, as it may provide better symptom relief with fewer complications in patients with a longer prognosis [Homs et al 2004].

Table 10.5
Characteristics of stent procedure across tumour sites

	Oes SCC	Upper/Mid ACA	Lower/SI ACA	GOJ SII/SIII	Stomach	Overall
Stent type (%)						
Plastic	4%	3%	4%	3%	2%	**3%**
Metal: Covered	84%	77%	79%	87%	61%	**79%**
Metal: Uncovered	8%	9%	11%	4%	33%	**11%**
Metal: Anti-reflux	4%	12%	6%	6%	5%	**6%**
Method of Stent Placement (%)						
Fluoroscopic control alone	22%	20%	22%	18%	20%	**21%**
Endoscopic control alone	34%	35%	33%	37%	28%	**34%**
Endoscopy and Fluoroscopy	44%	45%	45%	45%	52%	**45%**

Reporting of complications following stent insertion was poor, with complications only being reported in 83 patients. Where complications were reported, the most common ones were stent migration and tumour overgrowth. Overall 99 patients were recorded as having an additional unplanned endoscopic procedure within 3 months of their initial procedure, 49 of these had experienced a complication following their initial procedure. The most common unplanned procedure was stenting, which was frequently re-stenting. Results from the previous Registry of Oesophageal Stenting (2004) suggested that 4-5 per cent patients needed a repeat endoscopy within 3 months, rising to 19 per cent between 3 and 6 months and to 28 per cent after 6 months.

It is interesting to note that after brachytherapy no complications were recorded, in particular no patients required stenting at a later date.

Conclusions on palliative treatment patterns and outcomes

Oncology records were entered for 78 per cent of patients who were planned to have palliative oncological therapy. Of this group 64 per cent were treated with chemotherapy, 29 per cent with radiotherapy and the remaining 7 per cent with a combination.

Palliative radiotherapy was generally very well tolerated with 93 per cent completing planned treatment, but completion rates for planned palliative chemotherapy were disappointing with only half completing their planned treatment. On the whole patients who did not complete their palliative chemotherapy were older and had a poorer performance status as expected.

Overall 1,680 endoscopic/radiological procedures were recorded. Of these 91 per cent were for stent insertion, this was associated with 98 per cent success in deployment. Choice of stent was predominantly uncovered metal stents, with increasing proportions placed either endoscopic or combined fluoroscopic/endoscopic guidance. Complication rates after stent insertion was relatively low at 5 per cent (but this is likely due to underreporting), with main complications reported being stent migration and overgrowth.

Brachytherapy is still relatively underutilised, particularly considering that 57 per cent of patients who were stented survived more than 90 days. In this Audit, only 4 Cancer Networks reported using brachytherapy, and there were no recorded complications after brachytherapy. In the future it may be worth considering coordinating brachytherapy services, so that trusts refer into specialist trusts and uptake may increase.

Comparison with First Audit

- Use of palliative oncology has not changed significantly since the first Audit.
- It is difficult to reach firm conclusions with regard to changes in use of endoscopic treatments compared to the first Audit, due to poor data completeness.
- Fewer trusts reported using brachytherapy, previously 6 Networks recorded using it and now only 4 do.
- Reduction in number of patients treated with endoscopic dilatation alone, in line with recommendations that it should not be used except for treating strictures secondary to radiotherapy.
- Change in approach to stent placement, with significant reduction in those inserted under fluoroscopic guidance alone from 41 per cent to 21 per cent, with corresponding increases in those inserted using endoscopy alone or combined approach. This may reflect a change in referral patterns, with fewer cases being referred for radiological placement. Although current recommendations suggest use of additional fluoroscopic guidance where possible.

Conclusions and recommendations

Building on the success of previous reports, this 2013 Annual Report provides detailed analysis of the effect that considerable investment and reorganisation of NHS O-G cancer services over the last decade has had on patient care.

This is the largest national Audit of oesophago-gastric cancer care performed in the world. We have only been able to achieve this due to the tremendous support from NHS trusts and Cancer Networks, the professional bodies and patient groups involved in O-G cancer care, and because of funding provided by the Healthcare Quality Improvement Partnership.

Our findings show that, overall, clinicians are providing a high quality of care for patients. Most encouragingly mortality for curative surgery continues to fall since the first Audit, with 30-day mortality of 1.7 per cent after oesophagectomy and 1.1 per cent after gastrectomy. Since the first Audit, an increased proportion of procedures are being performed with a minimally invasive approach.

The Audit highlighted a few key areas where Cancer Networks and NHS trusts should investigate their results further. These include:

- Route to referral: A significant proportion of patients are still diagnosed as a result of an emergency admission, these patients are less likely to be suitable for curative therapy. There is considerable variation in rates across Cancer Networks. So there needs to be careful assessment to look at reasons behind this variation, with the aim to improve strategies to improve early diagnosis in the future.
- Staging investigations: There is continued variation in reported use of EUS and Staging laparoscopy across Cancer Networks. Identifying patients suitable for curative treatment requires optimal use of appropriate staging investigations, so this variation remains an area of concern.
- Curative treatment for oesophageal SCC: This Audit has demonstrated increased use of definitive chemoradiotherapy in the treatment of oesophageal SCC, but a substantial proportion of patients are still being managed surgically. It is important that all such patients are discussed with both a clinical oncologist who specialises in the treatment of Upper GI Cancers as well as a surgeon, to ensure that less invasive treatment options are considered where they may be suitable.
- Monitoring of complication rates and markers for effectiveness of surgery for both open and MI surgery: This Audit showed similar post-operative outcomes for MI versus open surgery, but respiratory complications may be slightly higher with hybrid operations. It is also important to monitor resection margins, this Audit highlighted that 9 per cent of gastrectomy and 4 per cent of oesophagectomy specimens have positive resection margins which is associated with a reduced chance of cure. It is therefore important that trusts continue to monitor their outcomes prospectively.
- Low reported use of brachytherapy: Only 4 Networks reported using brachytherapy during the Audit period, this is despite 57 per cent patients surviving more than 3 months after stenting. This suggests there may be room to increase use of brachytherapy in the future. Thought should go into optimising access to such services, and possibly centralising services in the future.

Appendix 1: Organisation of the Audit

The project is assisted by a Clinical Reference Group (CRG), the membership of which is drawn from all of the clinical groups involved in the management of oesophago-gastric cancer and overseen by a Project Board, which has senior representatives from the four participating organisations and the funding body.

Members of Clinical Reference Group		
Mike Hallisey	Consultant Surgeon Birmingham	Association of Cancer Surgeons
Paul Barham	Consultant Surgeon Bristol	Association of Upper Gastrointestinal Surgeons of Great Britain & Ireland
Martin Richardson	Consultant Surgeon	Cancer Networks
Helen Laing	Clinical Audit Commissioning Manager	Healthcare Quality Improvement Partnership (HQIP)
Jan van der Meulen (chair)	Professor of Clinical Epidemiology	London School of Hygiene and Tropical Medicine
Bill Allum	National O-G Cancer Lead (joint)	National Cancer Action Team
Chris Carrigan	National Co-ordinator for Cancer Registration	National Cancer Action Team
David Kirby OBE	Chairman	Oesophageal Patients Association
Vicki Owen-Holt	Specialist Nurse	Royal College of Nursing
Nic Mapstone	Consultant Pathologist	Royal College of Pathologists
Hans-Ulrich Laasch	Consultant Radiologist	Royal College of Radiologists
Sam Ahmedzai	Professor of Supportive Care Medicine	Palliative Care Representative
Tom Crosby	Consultant Clinical Oncologist	Cancer Services Co-ordinating Group, Wales
Nick Carroll	Consultant Radiologist and Endoscopist	UK EUS Users Group
Fiona Macharg	Specialist Dietitian	British Dietetic Association Oncology Group
Greg Rubin	Professor General Practice and Primary Care	Primary Care Representative

Members of Project Board	
Dr David Sanders	British Society of Gastroenterologist
Professor Mike Griffin	Association of Upper Gastrointestinal Surgeons of Great Britain & Ireland
Julie Henderson	Health and Social Care Information Centre
Helen Laing	Healthcare Quality Improvement Partnership (HQIP)
Professor Jan van der Meulen (chair)	London School of Hygiene and Tropical Medicine
Dr Diana Tait	Royal College Radiologists

Appendix 2: Summary of data used

Overall case-ascertainment

The Audit used Hospital Episode Statistics (HES) to estimate how many of the patients diagnosed between 1 April 2011 and 31 March 2012 were submitted by English NHS trusts. The estimate was based on the activity data from HES that was linked to the Audit dataset.

In total, English NHS trusts submitted information to the Audit on 12,364 patients. However, information about the tumour characteristics and treatments received was entered for only 11,516 patients, of which 772 were from Wales. Patients outside the Audit period and duplicates were removed. Consequently, the Audit received clinical information on 11,516 patients.

We estimated the number of patients diagnosed in England with O-G cancer and derived the number of patients whose first record with O-G cancer (ICD code: C15/C16) in Hospital Episode Statistics was within the Audit period. The estimated number of cases was 13,003. Given the number of tumour records submitted for the Audit, this yields a case-ascertainment of around 83 per cent. This corresponds to a 10 per cent increase from the previous Audit.

Completeness of submitted data

In terms of the O-G cancer treatments performed in England and Wales, the Audit received information on 2,342 surgical procedures and 5,155 courses of primary oncological therapy, and 1,680 endoscopic/radiological palliative therapies.

The completeness of data submitted by English NHS trusts could not be judged for oncological or endoscopic/radiological palliative therapies due to the lack of a reliable denominator. For surgical resections, a comparison could be made using HES. We identified 2,567 surgical resections in the HES dataset. Comparing this with the 2,253 resections performed in English trusts gives an estimated case-ascertainment rate of 88 per cent.

Data completeness of treatment intent and treatment modality was consistently high, with valid values for 94 per cent and 93 per cent of patients overall, respectively. The pretreatment M-stage data item had the lowest level of completeness amongst these four items. Pretreatment M-stage is an important determinant of whether treatment intent will be curative or palliative, and should be available after a patient has a CT-scan.

The level of data completeness across NHS trusts was more variable (appendix 3). Some NHS trusts provided a large number of records and complete records. Others were providing fewer details.

Many NHS trusts have achieved a high level of case-ascertainment in this Audit. We commend their staff for the effort and diligence in this on-going Audit. For others, participation was limited, either because few patients were registered or because clinical information was incomplete.

A number of cancer centres failed to participate fully. Given their central role in the organisation of care, cancer centres should be taking the lead in the implementation of procedures for monitoring of treatment selection and outcomes of care within the Cancer Networks, including participation in the national Audit.

Appendix 3: Levels of case-ascertainment and data completeness for English NHS trusts

Key	Case Ascertainment (CA)
●	Values in green indicate an estimated case-ascertainment above 80 per cent
■	Values in yellow indicate an estimated case-ascertainment between 80-60 per cent
▲	Values in red indicate an estimated case-ascertainment below 60 per cent

Note: Estimates of the number of patients diagnosed in England with O-G cancer are derived from the number of patients whose first record with O-G cancer (ICD code: C15/C16) in Hospital Episode Statistics was within the Audit period. HES data do not provide a gold-standard for comparison, but can give an indication on major discrepancies between patients submitted in the audit and patients documented to receiving care for O-G cancer in HES.

Trust code	Network / Trust name	Expected cases based on HES	Tumour records submitted	Case ascertainment	% patients with M-stage after CT	% patients with planned intent	% patients with planned modality
N01	**Lancashire & South Cumbria**						
RXL	Blackpool, Fylde and Wyre Hospitals NHS Foundation Trust	51-100	80	> 80%	91% ●	96% ●	70% ■
RXR	East Lancashire Hospitals NHS Trust	101-150	115	> 80%	86% ●	50% ▲	24% ▲
RXN	Lancashire Teaching Hospitals NHS Foundation Trust	101-150	52	20 - 40%	87% ●	4% ▲	2% ▲
RTX	University Hospitals Of Morecambe Bay NHS Trust	101-150	90	> 80%	70% ■	29% ▲	3% ▲
N02	**Greater Manchester and Cheshire**						
RMC	Bolton Hospitals NHS Trust	51-100	71	> 80%	99% ●	94% ●	96% ●
RW3	Central Manchester University Hospitals NHS Foundation Trust	51-100	103	> 80%	88% ●	99% ●	66% ■
RBV	Christie Hospital NHS Foundation Trust	NA (Tertiary treatment centre only)	NA	NA	NA	NA	NA
RJN	East Cheshire NHS Trust	51-100	59	> 80%	96% ●	96% ●	68% ■
RW6	Pennine Acute Hospitals NHS Trust	>150	186	> 80%	85% ●	94% ●	82% ●
RM3	Salford Royal NHS Foundation Trust	51-100	68	60 - 80%	89% ●	100% ●	78% ■
RWJ	Stockport NHS Foundation Trust	51-100	75	> 80%	73% ■	96% ●	56% ▲
RMP	Tameside Hospital NHS Foundation Trust	51-100	25	40 - 60%	72% ■	24% ▲	52% ▲
RBT	The Mid Cheshire Hospitals NHS Trust	51-100	57	60 - 80%	71% ■	61% ■	32% ▲
RM4	Trafford Healthcare NHS Trust	<50	14	60 - 80%	25% ▲	92% ●	67% ■
RM2	University Hospitals of South Manchester NHS Foundation Trust	51-100	71	> 80%	94% ●	100% ●	65% ■
RRF	Wrightington, Wigan and Leigh NHS Trust	51-100	63	> 80%	98% ●	89% ●	65% ■
N03	**Merseyside & Cheshire**						
REM	Aintree University Hospitals NHS Foundation Trust	101-150	82	60 - 80%	82% ●	71% ■	33% ▲
REN	Clatterbridge Centre for Oncology NHS Foundation Trust	NA (Tertiary treatment centre only)	NA	NA	NA	NA	NA
RJR	Countess of Chester Hospital NHS Foundation Trust	51-100	19	20 - 40%	5% ▲	68% ■	0% ▲
RBQ	Liverpool Heart and Chest NHS Foundation Trust	NA (Tertiary treatment centre only)	NA	NA	NA	NA	NA
RQ6	Royal Liverpool and Broadgreen University Hospitals NHS Trust	101-150	105	> 80%	87% ●	89% ●	67% ■
RVY	Southport and Ormskirk Hospital NHS Trust	51-100	71	> 80%	88% ●	94% ●	64% ■
RBN	St Helens and Knowsley Hospitals NHS Trust	51-100	59	60 - 80%	71% ■	86% ●	55% ▲
RWW	Warrington and Halton Hospitals NHS Foundation Trust	51-100	50	60 - 80%	82% ●	90% ●	55% ▲
RBL	Wirral University Teaching Hospital NHS Foundation Trust	51-100	78	60 - 80%	78% ■	76% ■	50% ▲
N06	**Yorkshire**						
RCF	Airedale NHS Trust	<50	39	> 80%	41% ▲	97% ●	62% ■
RAE	Bradford Teaching Hospitals NHS Foundation Trust	51-100	67	60 - 80%	45% ▲	98% ●	77% ■
RWY	Calderdale and Huddersfield NHS Foundation Trust	51-100	61	60 - 80%	68% ■	62% ■	70% ■
RCD	Harrogate and District NHS Foundation Trust	<50	46	> 80%	76% ■	89% ●	78% ■
RR8	Leeds Teaching Hospitals NHS Trust	>150	172	60 - 80%	80% ●	2% ▲	3% ▲
RXF	Mid Yorkshire Hospitals NHS Trust	101-150	109	60 - 80%	61% ■	94% ●	31% ▲
RCB	York Hospitals NHS Foundation Trust	51-100	99	> 80%	68% ■	100% ●	81% ●
N07	**Humber & Yorkshire Coast**						
RWA	Hull and East Yorkshire Hospitals NHS Trust	>150	119	60 - 80%	83% ●	98% ●	74% ■
RJL	Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	51-100	100	> 80%	88% ●	98% ●	84% ●
RCC	Scarborough and North East Yorkshire Health Care NHS Trust	<50	48	> 80%	85% ●	100% ●	70% ■
N08	**North Trent**						
RFF	Barnsley Hospital NHS Foundation Trust	<50	49	> 80%	13% ▲	98% ●	58% ▲
RFS	Chesterfield Royal Hospital NHS Foundation Trust	51-100	73	> 80%	83% ●	99% ●	77% ■
RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust	101-150	129	> 80%	48% ▲	100% ●	96% ●
RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	>150	301	> 80%	63% ■	100% ●	93% ●
RFR	The Rotherham NHS Foundation Trust	51-100	51	60 - 80%	92% ●	100% ●	68% ■

Trust code	Network / Trust name	Expected cases based on HES	Tumour records submitted	Case ascertainment	% patients with M-stage after CT	% patients with planned intent	% patients with planned modality
N11	**Pan Birmingham**						
RR1	Heart of England NHS Foundation Trust	>150	137	60 - 80%	69% ■	79% ■	63% ■
RXK	Sandwell and West Birmingham Hospitals NHS Trust	51-100	54	40 - 60%	91% ●	100% ●	39% ▲
RRK	University Hospital Birmingham NHS Foundation Trust	101-150	212	> 80%	100% ●	100% ●	78% ■
RBK	Walsall Hospitals NHS Trust	51-100	10	< 20%	20% ▲	20% ▲	10% ▲
N12	**Arden**						
RLT	George Eliot Hospital NHS Trust	<50	39	> 80%	49% ▲	87% ●	64% ■
RJC	South Warwickshire General Hospitals NHS Trust	<50	28	> 80%	89% ●	100% ●	74% ■
RKB	University Hospitals Coventry and Warwickshire NHS Trust	101-150	101	60 - 80%	64% ■	97% ●	97% ●
N20	**Mount Vernon**						
RWH	East and North Hertfordshire NHS Trust	51-100	87	> 80%	80% ●	100% ●	75% ■
RC9	Luton and Dunstable Hospital NHS Foundation Trust	51-100	57	> 80%	81% ●	100% ●	67% ■
RWG	West Hertfordshire Hospitals NHS Trust	51-100	82	> 80%	47% ▲	87% ●	67% ■
N21	**North West London**						
RQM	Chelsea and Westminster Hospital NHS Foundation Trust	<50	32	> 80%	93% ●	100% ●	78% ■
RC3	Ealing Hospital NHS Trust	<50	16	60 - 80%	100% ●	100% ●	69% ■
RYJ	Imperial College Healthcare NHS Trust	101-150	113	> 80%	95% ●	100% ●	71% ■
RV8	North West London Hospitals NHS Trust	51-100	30	40 - 60%	69% ■	100% ●	93% ●
RAS	The Hillingdon Hospital NHS Trust	<50	34	> 80%	91% ●	100% ●	67% ■
RFW	West Middlesex University Hospital NHS Trust	<50	22	> 80%	91% ●	100% ●	82% ●
N22	**North London**						
RVL	Barnet and Chase Farm Hospitals NHS Trust	51-100	20	20 - 40%	37% ▲	100% ●	95% ●
RAP	North Middlesex University Hospital NHS Trust	<50	0	< 20%	100% ●	100% ●	100% ●
RAL	Royal Free Hampstead NHS Trust	<50	26	60 - 80%	46% ▲	100% ●	92% ●
RQW	The Princess Alexandra Hospital NHS Trust	<50	3	< 20%	0% ▲	67% ■	67% ■
RKE	The Whittington Hospital NHS Trust	<50	10	40 - 60%	100% ●	100% ●	100% ●
RRV	University College London Hospitals NHS Foundation Trust	51-100	201	> 80%	96% ●	100% ●	91% ●
N23	**North East London**						
RF4	Barking, Havering and Redbridge Hospitals NHS Trust	101-150	127	> 80%	78% ■	99% ●	73% ■
RNJ	Barts and The London NHS Trust	51-100	50	> 80%	100% ●	100% ●	80% ●
RQX	Homerton University Hospital NHS Foundation Trust	<50	32	> 80%	91% ●	100% ●	81% ●
RNH	Newham University Hospital NHS Trust	<50	10	40 - 60%	50% ▲	100% ●	50% ▲
RGC	Whipps Cross University Hospital NHS Trust	51-100	60	> 80%	67% ■	58% ▲	63% ■
N24	**South East London**						
RJ1	Guy's and St Thomas' NHS Foundation Trust	101-150	78	60 - 80%	47% ▲	99% ●	64% ■
RJZ	King's College Hospital NHS Foundation Trust	<50	36	> 80%	56% ▲	100% ●	86% ●
RYQ	South London Healthcare NHS Trust	>150	99	60 - 80%	43% ▲	96% ●	81% ●
RJ2	The Lewisham Hospital NHS Trust	<50	13	40 - 60%	0% ▲	100% ●	9% ▲
N25	**South West London**						
RJ6	Croydon Health Services NHS Trust	<50	51	> 80%	86% ●	94% ●	88% ●
RVR	Epsom and St Helier University Hospitals NHS Trust	51-100	49	> 80%	94% ●	94% ●	90% ●
RAX	Kingston Hospital NHS Trust	<50	37	> 80%	95% ●	100% ●	97% ●
RJ7	St George's Healthcare NHS Trust	51-100	10	< 20%	100% ●	100% ●	90% ●
RPY	The Royal Marsden NHS Foundation Trust	51-100	31	40 - 60%	100% ●	100% ●	97% ●
N26	**Peninsula**						
RBZ	Northern Devon Healthcare NHS Trust	<50	40	> 80%	77% ■	87% ●	68% ■
RK9	Plymouth Hospitals NHS Trust	101-150	116	> 80%	41% ▲	98% ●	72% ■
REF	Royal Cornwall Hospitals NHS Trust	101-150	89	> 80%	90% ●	99% ●	79% ■
RH8	Royal Devon and Exeter NHS Foundation Trust	101-150	90	> 80%	83% ●	100% ●	78% ■
RA9	South Devon Health Care NHS Foundation Trust	51-100	76	> 80%	83% ●	97% ●	81% ●
N27	**Dorset**						
RBD	Dorset County Hospitals NHS Foundation Trust	51-100	35	60 - 80%	97% ●	97% ●	77% ■
RD3	Poole Hospital NHS Foundation Trust	51-100	51	60 - 80%	59% ▲	20% ▲	18% ▲
RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	51-100	76	60 - 80%	75% ■	97% ●	79% ■
N28	**Avon, Somerset & Wiltshire**						
RVJ	North Bristol NHS Trust	51-100	42	40 - 60%	86% ●	76% ■	52% ▲
RD1	Royal United Hospital Bath NHS Trust	51-100	65	> 80%	32% ▲	32% ▲	26% ▲
RBA	Taunton and Somerset NHS Foundation Trust	51-100	66	> 80%	62% ■	14% ▲	42% ▲

Trust code	Network / Trust name	Expected cases based on HES	Tumour records submitted	Case ascertainment	% patients with M-stage after CT	% patients with planned intent	% patients with planned modality
RA7	University Hospitals Bristol NHS Foundation Trust	101-150	149	> 80%	79% ■	64% ■	58% ▲
RA3	Weston Area Health NHS Trust	<50	30	60 - 80%	93% ●	100% ●	77% ■
RA4	Yeovil District Hospital NHS Foundation Trust	<50	34	> 80%	57% ▲	57% ▲	39% ▲
N29	**Three Counties**						
RTE	Gloucestershire Hospitals NHS Foundation Trust	>150	136	60 - 80%	78% ■	100% ●	85% ●
RWP	Worcestershire Acute Hospitals NHS Trust	>150	149	> 80%	48% ▲	46% ▲	47% ▲
RLQ	Wye Valley NHS Trust	<50	45	> 80%	89% ●	100% ●	82% ●
N30	**Thames Valley**						
RXQ	Buckinghamshire Healthcare NHS Trust	51-100	33	40 - 60%	44% ▲	97% ●	47% ▲
RN3	Great Western Hospitals NHS Foundation Trust	51-100	33	40 - 60%	100% ●	94% ●	85% ●
RD7	Heatherwood and Wexham Park Hospitals NHS Foundation Trust	51-100	67	> 80%	38% ▲	95% ●	92% ●
RD8	Milton Keynes Hospital NHS Foundation Trust	51-100	31	60 - 80%	15% ▲	67% ■	44% ▲
RTH	Oxford University Hospitals NHS Trust	>150	184	> 80%	96% ●	100% ●	98% ●
RHW	Royal Berkshire NHS Foundation Trust	51-100	37	20 - 40%	8% ▲	100% ●	5% ▲
N31	**Central South Coast**						
RN5	Basingstoke & North Hampshire NHS Foundation Trust	51-100	30	40 - 60%	83% ●	100% ●	77% ■
5QT	Isle of Wight Healthcare NHS Trust	<50	39	> 80%	100% ●	97% ●	79% ■
RHU	Portsmouth Hospitals NHS Trust	101-150	137	> 80%	99% ●	100% ●	89% ●
RNZ	Salisbury NHS Foundation Trust	<50	30	> 80%	70% ■	100% ●	83% ●
RHM	Southampton University Hospitals NHS Trust	101-150	131	> 80%	94% ●	100% ●	82% ●
RYR16	Western Sussex Hospitals NHS Trust (St Richard's Hospital)	51-100	54	> 80%	50% ▲	46% ▲	58% ▲
RN1	Winchester and Eastleigh Healthcare NHS Trust	<50	40	> 80%	76% ■	95% ●	76% ■
N32	**Surrey, West Sussex & Hampshire**						
RTK	Ashford and St Peter's Hospitals NHS Trust	<50	38	> 80%	0% ▲	63% ■	21% ▲
RDU	Frimley Park Hospital NHS Foundation Trust	51-100	46	60 - 80%	2% ▲	61% ■	20% ▲
RA2	Royal Surrey County Hospital NHS Trust	51-100	66	> 80%	2% ▲	45% ▲	26% ▲
RTP	Surrey and Sussex Healthcare NHS Trust	<50	45	> 80%	0% ▲	47% ▲	11% ▲
N33	**Sussex**						
RXH	Brighton and Sussex University Hospitals NHS Trust	51-100	97	> 80%	24% ▲	51% ▲	25% ▲
RXC	East Sussex Hospitals NHS Trust	101-150	113	> 80%	66% ■	59% ▲	23% ▲
RYR18	Western Sussex Hospitals NHS Trust (Worthing Hospital)	<50	48	> 80%	60% ■	59% ▲	67% ■
N34	**Kent & Medway**						
RN7	Dartford and Gravesham NHS Trust	<50	37	> 80%	35% ▲	100% ●	76% ■
RVV	East Kent Hospitals NHS Trust	>150	104	60 - 80%	25% ▲	33% ▲	64% ■
RWF	Maidstone and Tunbridge Wells NHS Trust	101-150	95	60 - 80%	73% ■	97% ●	84% ●
RPA	Medway NHS Foundation Trust	51-100	26	20 - 40%	23% ▲	46% ▲	81% ●
N35	**Greater Midlands**						
RNA	Dudley Group of Hospitals NHS Trust	101-150	5	< 20%	40% ▲	40% ▲	80% ●
RJD	Mid Staffordshire General Hospitals NHS Trust	51-100	58	> 80%	95% ●	98% ●	81% ●
RXW	Shrewsbury and Telford Hospital NHS Trust	>150	135	> 80%	66% ■	90% ●	44% ▲
RL4	The Royal Wolverhampton Hospitals NHS Trust	101-150	88	> 80%	91% ●	81% ●	66% ■
RJE	University Hospital of North Staffordshire NHS Trust	>150	100	40 - 60%	9% ▲	39% ▲	13% ▲
N36	**North of England**						
RLN	City Hospitals Sunderland NHS Foundation Trust	51-100	75	> 80%	77% ■	99% ●	91% ●
RXP	County Durham and Darlington NHS Foundation Trust	101-150	133	> 80%	96% ●	96% ●	59% ▲
RR7	Gateshead Health NHS Foundation Trust	51-100	44	> 80%	82% ●	100% ●	73% ■
RNL	North Cumbria Acute Hospitals NHS Trust	51-100	96	> 80%	94% ●	100% ●	83% ●
RVW	North Tees and Hartlepool NHS Trust	51-100	86	> 80%	90% ●	100% ●	75% ■
RTF	Northumbria Health Care NHS Foundation Trust	101-150	102	> 80%	82% ●	98% ●	79% ■
RTR	South Tees Hospitals NHS Trust	101-150	110	> 80%	98% ●	99% ●	98% ●
RE9	South Tyneside NHS Foundation Trust	<50	37	> 80%	92% ●	100% ●	65% ■
RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust	>150	126	60 - 80%	85% ●	98% ●	77% ■
N37	**Anglia**						
RC1	Bedford Hospital NHS Trust	51-100	46	> 80%	72% ■	87% ●	65% ■
RGT	Cambridge University Hospitals NHS Foundation Trust	101-150	145	> 80%	76% ■	100% ●	57% ▲
RQQ	Hinchingbrooke Healthcare NHS Trust	<50	29	60 - 80%	62% ■	100% ●	59% ▲
RGP	James Paget University Hospitals NHS Foundation Trust	51-100	64	> 80%	89% ●	98% ●	81% ●
RM1	Norfolk and Norwich University Hospital NHS Trust	101-150	126	> 80%	78% ■	100% ●	77% ■
RGN	Peterborough and Stamford Hospitals NHS Foundation Trust	51-100	23	20 - 40%	86% ●	100% ●	45% ▲

Trust code	Network / Trust name	Expected cases based on HES	Tumour records submitted	Case ascertainment	% patients with M-stage after CT	% patients with planned intent	% patients with planned modality
RCX	The Queen Elizabeth Hospital King's Lynn NHS Trust	51-100	78	> 80%	52% ▲	97% ●	72% ■
RGR	West Suffolk Hospitals NHS Trust	<50	64	> 80%	67% ■	92% ●	62% ■
N38	**Essex**						
RDD	Basildon and Thurrock University Hospitals NHS Foundation Trust	51-100	52	> 80%	44% ▲	90% ●	80% ●
RDE	Colchester Hospital University NHS Foundation Trust	101-150	82	60 - 80%	22% ▲	96% ●	73% ■
RGQ	Ipswich Hospital NHS Trust	51-100	69	> 80%	94% ●	99% ●	83% ●
RQ8	Mid Essex Hospital Services NHS Trust	51-100	72	60 - 80%	44% ▲	59% ▲	64% ■
RAJ	Southend Hospital NHS Trust	51-100	59	60 - 80%	40% ▲	95% ●	64% ■
N39	**East Midlands**						
RJF	Burton Hospitals NHS Trust	<50	54	> 80%	72% ■	79% ■	64% ■
RTG	Derby Hospitals NHS Foundation Trust	>150	130	> 80%	90% ●	98% ●	65% ■
RNQ	Kettering General Hospital NHS Trust	51-100	68	> 80%	72% ■	96% ●	78% ■
RNS	Northampton General Hospital NHS Trust	51-100	64	60 - 80%	67% ■	100% ●	64% ■
RX1	Nottingham University Hospitals NHS Trust	>150	183	> 80%	85% ●	97% ●	76% ■
RK5	Sherwood Forest Hospitals NHS Foundation Trust	51-100	62	60 - 80%	97% ●	100% ●	71% ■
RWD	United Lincolnshire Hospitals NHS Trust	>150	54	20 - 40%	47% ▲	100% ●	92% ●
RWE	University Hospitals of Leicester NHS Trust	>150	213	> 80%	96% ●	100% ●	71% ■

Appendix 4: Comparative analysis of outcomes after curative surgery for NHS organisations in England and Wales

Note: The overall volume of procedures based on one year of Audit data is small and as postoperative mortality is low, the power to detect true outliers is limited. Therefore, results reported for individual NHS trusts should not be considered as ultimate evidence, but rather as indicators to direct further local enquiry into the quality of care. Outcomes for NHS trusts with a volume smaller than 10 cases per year are not reported here.

Mortality rates of 0 per cent are likely to represent chance findings, as the overall mortality is low in this patient group. Complication rates of 0 per cent may also represent chance findings; however, may also be caused by insufficient coding.

Network Code	Network Name	Trust Code	Trust name	Type		Number of cases	30 day mortality - crude	30 day mortality - adjusted	90 day mortality - crude	90 day mortality - adjusted	Leak rate - crude	Leak rate - adjusted	Reoperation - crude	Reoperation - adjusted
N01	Lancashire and South Cumbria	RXL	Blackpool, Fylde and Wyre Hospitals NHS Foundation Trust	Unit		4	*	*	*	*	*	*	*	*
		RXN	Lancashire Teaching Hospitals NHS Foundation Trust	Centre		8	*	*	*	*	*	*	*	*
N02	Greater Manchester and Chesire	RM2	University Hospitals of South Manchester NHS Foundation Trust	Centre		19	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		RM3	Salford Royal NHS Foundation Trust	Centre		84	3.7%	3.1%	3.7%	3.2%	1.1%	0.9%	5.5%	4.9%
		RW3	Central Manchester University Hospitals NHS Foundation Trust	Unit		25	8.3%	6.7%	12.5%	9.9%	19.2%	22.0%	15.4%	16.8%
N03	Merseyside and Chesire	RBL	Wirral University Teaching Hospital NHS Foundation Trust	Unit		1	*	*	*	*	*	*	*	*
		RBN	St Helens and Knowsley Hospitals NHS Trust	Unit		1	*	*	*	*	*	*	*	*
		RBQ	Liverpool Heart and Chest NHS Foundation Trust	Centre		84	0.0%	0.0%	3.6%	3.2%	4.5%	5.7%	5.7%	6.2%
		REM	Aintree University Hospitals NHS Foundation Trust	Centre		34	0.0%	0.0%	0.0%	0.0%	3.1%	3.5%	9.4%	9.3%
		RJR	Countess of Chester Hospital NHS Foundation Trust	Unit		1	*	*	*	*	*	*	*	*
		RVY	Southport and Ormskirk Hospital NHS Trust	Unit		1	*	*	*	*	*	*	*	*
N06	Yorkshire	RAE	Bradford Teaching Hospitals NHS Foundation Trust	Centre		42	2.4%	2.6%	2.4%	2.3%	13.9%	12.5%	8.3%	8.0%
		RR8	Leeds Teaching Hospitals NHS Trust	Centre		53	0.0%	0.0%	3.8%	4.4%	0.0%	0.0%	4.3%	8.8%
		RWY	Calderdale and Huddersfield NHS Foundation Trust	Unit		5	*	*	*	*	*	*	*	*
N07	Humber and Yorkshire Coast	RJL	Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	Unit		1	*	*	*	*	*	*	*	*
		RWA	Hull and East Yorkshire Hospitals NHS Trust	Centre		54	0.0%	0.0%	3.6%	5.0%	5.5%	5.9%	0.0%	0.0%
N08	North Trent	RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	Centre		58	1.7%	2.1%	1.7%	1.9%	12.5%	12.5%	4.7%	4.6%
		RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust	Centre		35	2.9%	4.2%	2.9%	4.1%	5.6%	5.3%	22.2%	22.1%
N11	Pan Birmingham	RR1	Heart of England NHS Foundation Trust	Centre		23	4.3%	3.9%	4.3%	4.3%	4.3%	6.7%	8.7%	13.2%
		RRK	University Hospital Birmingham NHS Foundation Trust	Centre		60	6.7%	7.7%	6.7%	8.4%	13.3%	11.1%	13.3%	11.5%
N12	Arden	RKB	University Hospitals Coventry and Warwickshire NHS Trust	Centre		51	2.0%	1.1%	7.8%	4.8%	7.5%	5.2%	15.1%	12.8%
N20	Mount Vernon	RC9	Luton and Dunstable Hospital NHS Foundation Trust	Unit		1	*	*	*	*	*	*	*	*
		RWG	West Hertfordshire Hospitals NHS Trust	Centre		23	0.0%	0.0%	4.3%	4.2%	0.0%	0.0%	4.5%	4.0%
N21	North West London	RAS	The Hillingdon Hospital NHS Trust	Unit		1	*	*	*	*	*	*	*	*
		RV8	North West London Hospitals NHS Trust	Unit		1	*	*	*	*	*	*	*	*
		RYJ	Imperial College Healthcare NHS Trust	Centre		36	0.0%	0.0%	2.8%	2.1%	14.7%	13.7%	11.8%	12.1%
N22	North London	RRV	University College London Hospitals NHS Foundation Trust	Centre		35	0.0%	0.0%	0.0%	0.0%	1.9%	1.5%	3.7%	3.3%
N23	North East London	RF4	Barking, Havering and Redbridge Hospitals NHS Trust	Centre		37	0.0%	0.0%	0.0%	0.0%	7.7%	7.7%	5.1%	5.0%
		RGC	Whipps Cross University Hospital NHS Trust	Unit		1	*	*	*	*	*	*	*	*
		RNJ	Barts and The London NHS Trust	Centre		44	2.3%	2.4%	2.3%	1.8%	0.0%	0.0%	6.8%	6.6%
N24	South East London	RJ1	Guy's and St Thomas' NHS Foundation Trust	Centre		40	0.0%	0.0%	2.5%	2.2%	0.0%	0.0%	9.5%	9.9%
N25	South West London	RPY	The Royal Marsden NHS Foundation Trust	Centre		43	0.0%	0.0%	2.3%	2.3%	4.4%	4.4%	13.3%	13.2%
N26	Peninsula	RA9	South Devon Health Care NHS Foundation Trust	Unit		1	*	*	*	*	*	*	*	*
		RK9	Plymouth Hospitals NHS Trust	Centre		76	0.0%	0.0%	2.7%	2.0%	1.3%	1.0%	10.4%	9.0%
N27	Dorset	RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	Centre		39	2.6%	1.7%	2.6%	1.7%	0.0%	0.0%	0.0%	0.0%
N28	Avon, Somerset and Wiltshire	RA7	University Hospitals Bristol NHS Foundation Trust	Centre		71	0.0%	0.0%	1.4%	1.8%	8.0%	7.1%	14.7%	14.3%
N29	3 Counties	RTE	Gloucestershire Hospitals NHS Foundation Trust	Centre		41	0.0%	0.0%	0.0%	0.0%	18.8%	19.5%	12.5%	12.6%
N30	Thames Valley	RTH	Oxford University Hospitals NHS Trust	Centre		60	0.0%	0.0%	3.3%	4.6%	12.3%	11.6%	10.8%	10.5%
N31	Central South Coast	RHM	Southampton University Hospitals NHS Trust	Centre		54	5.6%	4.8%	7.4%	7.0%	5.5%	4.8%	10.9%	10.0%
		RHU	Portsmouth Hospitals NHS Trust	Centre		42	0.0%	0.0%	0.0%	0.0%	11.9%	12.0%	16.7%	17.4%
N32	Surrey, West Sussex and Hampsire	RA2	Royal Surrey County Hospital NHS Trust	Centre		43	4.7%	3.8%	7.0%	6.9%	0.0%	0.0%	0.0%	0.0%
N33	Sussex	RXH	Brighton and Sussex University Hospitals NHS Trust	Centre		26	0.0%	0.0%	3.8%	3.5%	3.6%	3.0%	0.0%	0.0%
N34	Kent and Midway	RWF	Maidstone and Tunbridge Wells NHS Trust	Centre		49	2.0%	2.8%	6.1%	8.0%	10.0%	11.7%	10.0%	11.3%
N35	Greater Midlands	RJE	University Hospital of North Staffordshire NHS Trust	Centre		5	*	*	*	*	*	*	*	*
		RNA	Dudley Group of Hospitals NHS Trust	Centre		3	*	*	*	*	*	*	*	*
N36	North of England	RNL	North Cumbria Acute Hospitals NHS Trust	Unit		1	*	*	*	*	*	*	*	*
		RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust	Centre		141	0.7%	0.7%	1.4%	1.3%	4.1%	3.7%	6.1%	5.5%
		RTR	South Tees Hospitals NHS Trust	Centre		57	0.0%	0.0%	1.8%	1.8%	5.0%	4.3%	1.7%	1.6%

Network Code	Network Name	Trust Code	Trust name	Type		Number of cases	30 day mortality - crude	30 day mortality - adjusted	90 day mortality - crude	90 day mortality - adjusted	Leak rate - crude	Leak rate - adjusted	Reoperation - crude	Reoperation - adjusted
N37	Anglia	RGT	Cambridge University Hospitals NHS Foundation Trust	Centre		65	0.0%	0.0%	3.1%	4.4%	1.5%	2.4%	1.5%	2.3%
		RM1	Norfolk and Norwich University Hospital NHS Trust	Centre		48	0.0%	0.0%	0.0%	0.0%	16.3%	11.6%	8.2%	6.9%
N38	Essex	RDE	Colchester Hospital University NHS Foundation Trust	Unit		1	*	*	*	*	*	*	*	*
		RQ8	Mid Essex Hospital Services NHS Trust	Centre		57	5.3%	5.8%	5.3%	6.1%	1.7%	2.9%	3.4%	5.7%
N39	East Midlands	RTG	Derby Hospitals NHS Foundation Trust	Centre		36	0.0%	0.0%	5.7%	5.2%	7.5%	6.5%	12.5%	11.2%
		RWD	United Lincolnshire Hospitals NHS Trust	Unit		7	*	*	*	*	*	*	*	*
		RWE	University Hospitals of Leicester NHS Trust	Centre		62	1.6%	2.0%	1.6%	2.0%	12.9%	11.7%	12.9%	11.8%
		RX1	Nottingham University Hospitals NHS Trust	Centre		82	2.6%	1.8%	7.7%	6.0%	6.5%	5.3%	6.5%	6.2%
N95	South Wales	7A2	Hywel Dda Health Board	Unit		8	*	*	*	*	*	*	*	*
		7A3	Abertawe Bro Morgannwg University	Unit		18	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		7A4	Cardiff and Vale University Health Board	Centre		11	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		7A6	Aneurin Bevan Health Board	Unit		1	*	*	*	*	*	*	*	*
N96	North Wales	7A1	Betsi Cadwaladr University Health Board	Centre		42	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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Glossary

Adjuvant treatment - An additional therapy (e.g. chemotherapy or radiotherapy) provided to improve the effectiveness of the primary treatment (e.g. surgery). This may aim to reduce the chance of local recurrence of the cancer or to improve the patient's overall chance of survival.

Ablation – a palliative technique (performed by laser or argon beam coagulation) that aims to reduce symptoms by destroying the surface of the tumour, thereby shrinking it in size.

AUGIS – Association of Upper Gastrointestinal Surgeons

BSG – British Society of Gastroenterologists

BASO – British Association of Surgical Oncology

Best Supportive Care – It is important that patients with incurable disease have a holistic approach to their treatment, taking consideration of their physical, emotional, and social needs.

Brachytherapy – Brachytherapy is a palliative treatment that involves inserting radioactive beads into the tumour. The radiation from these beads then slowly shrinks the tumour over time.

Cancer Registry – The Cancer Registries (Eight in England, and one each for Wales, Scotland and Northern Ireland) collect, analyse and report data on cancers in their area, and submit a standard dataset on these registrations to the Office for National Statistics.

CASU – The Clinical Audit Support Unit of the Health and Social Care Information Centre (HSCIC) manages a number of national clinical Audits in the areas of cancer, diabetes, dementia and pulmonary hypertension. It is one of the key stakeholders leading the Audit.

Chemotherapy – Drug therapy used to treat cancer. It may be used alone, or in conjunction with other types of treatment (e.g. surgery or radiotherapy).

Clinical Reference Group – The Audit's Clinical Reference Group (CRG) is comprised of representatives of the key stakeholders in oesophago-gastric cancer care. They advise the Project Team on particular aspects of the project and provide input from the wider clinical and patient community.

Clinical Effectiveness Unit – The Clinical Effectiveness Unit (CEU) is an academic collaboration between The Royal College of Surgeons of England and the London School of Hygiene and Tropical Medicine, and undertakes national surgical Audit and research. It is one of the key stakeholders leading the Audit.

Clinical Nurse Specialists (CNS) – These are experienced, senior nurses who have undergone specialist training. They play an essential role in improving communication with a cancer patient, being a first point of contact for the patient and coordinating the patient's treatment.

CT-scan – (Computed Tomography) an imaging modality that uses X-ray radiation to build up a 3-dimensional image of the body. Its main use in O-G cancer is to identify distant metastases, lymph node enlargement and involvement of organs adjacent to the tumour. It is not able to detect microscopic changes such as early seeding to lymph nodes.

Curative care – This is where the aim of the treatment is to cure the patient of the disease. It is not possible to do this in many patients with O-G cancer and is dependent on how far the disease has spread and the patient's general health and physical condition.

Dysphagia – A symptom where the patient experiences difficulty swallowing. They often complain that the food sticks in their throat. It is the commonest presenting symptom of oesophageal cancer.

Endoscopy – An investigation whereby a telescopic camera is used to examine the inside of the digestive tract. It can be used to guide treatments such as stents (see below).

Endoscopic ultrasound (EUS) – An investigation that uses an ultrasound probe on the end of a telescope. It is used to determine how deep into the surrounding tissues a cancer has invaded and to what extent it has spread to local lymph nodes. It also allows biopsy of lymph nodes around the oesophagus and stomach.

Endoscopic palliative therapies – These are treatments that aim to relieve symptoms, such as vomiting or swallowing difficulties, by using a telescopic camera to guide instruments that can relieve the blockage. Examples include stents, laser therapy and brachytherapy.

Fluoroscopy – A real-time x-ray modality that allows 'filming' of movement in the body, such as contrast swallow studies, or radiological insertion of stents.

Gastric – An adjective used to describe something that is related to or involves the stomach, e.g. gastric cancer is another way of saying stomach cancer.

Gastrectomy – A surgical procedure to remove either a section (a partial gastrectomy) or all (a total gastrectomy) of the stomach. In a total gastrectomy, the oesophagus is connected to the small intestine.

The Health and Social Care Information Centre – The Health and Social Care Information Centre (HSCIC) is the trusted source of authoritative data and information relating to health and social care. HSCIC's information, data and systems plays a fundamental role in driving better care, better services and better outcomes for patients. The Clinical Audit Support Unit (CASU) is one of its key components.

HES – Hospital Episode Statistics is a database which contains data on all in-patients treated within NHS trusts in England. This includes details of admissions, diagnoses and those treatments undergone.

ICD10 – International Statistical Classification of Diseases and Related Health Problems 10th Revision

Laparoscopy – This is often called "keyhole surgery" and involves inserting a small camera into the abdomen through a small cut, so as to either guide the operation or to look at the surface of the abdominal organs and so accurately stage the disease.

Laser therapy – This is a technique that uses a laser to destroy the surface of the tumour and thereby relieve any blockage. It is a palliative technique only.

Lymph nodes – Lymph nodes are small bean shaped organs, often also referred to as lymph 'glands', which form part of the immune system. They are distributed throughout the body and are usually the first place to which cancers spread.

MDT – The multi-disciplinary team is a group of professionals from diverse specialties that works to optimise diagnosis and treatment throughout the patient pathway.

Metastases – Metastases are deposits of cancer that occur when the cancer has spread from the place in which it started to other parts of the body. These are commonly called secondary cancers. Disease in which this has occurred is known as metastatic disease.

Minimally invasive surgery – A procedure performed through the skin or anatomical opening using a laparoscopic instrument rather than through an opening. Full minimally invasive oesophagectomies involve thoracoscopy for the chest-phase of the operation and laparoscopy for the abdominal phase. Oesophagectomies using minimally invasive techniques for only the abdominal or chest phase are commonly referred to as hybrid operations.

Neo-adjuvant chemotherapy – Chemotherapy given before another treatment, usually surgery. This is usually given to reduce the size, grade or stage of the cancer and therefore improve the effectiveness of the surgery performed.

NCEPOD – National Confidential Enquiry into Patient Outcome and Death. NCEPOD is an independent, government-funded body whose remit is to examine medical and surgical care, often by undertaking confidential surveys and research.

Neoplasm – A neoplasm or tumour is an abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Neoplasms may be benign (not cancerous) or malignant (cancerous).

NICE – The National Institute of Health and Clinical Excellence is an independent organisation responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health.

Oesophagus – The portion of the digestive tract that carries food from the bottom of the throat to the top of the stomach. It is also known as the gullet or the food pipe.

Oesophagectomy – The surgical removal of all or part of the oesophagus. The procedure can be performed by opening the thorax (a trans-thoracic oesophagectomy) or through openings in the neck and abdomen (a trans-hiatal oesophagectomy).

Oncology – The branch of medicine which deals with the non-surgical treatment of cancer, such as chemotherapy and radiotherapy.

ONS – The Office for National Statistics (ONS) is the government department responsible for collecting and publishing official statistics about the UK's society and economy. This includes cancer registration data.

Pathology – The branch of medicine that deals with tissue specimens under a microscope to determine the type of disease and how far a cancer has spread within the specimen (i.e. whether a tumour has spread to the edges of the specimen or lymph nodes).

Palliative care – Palliative care is the care given to patients whose disease cannot be cured. It aims to improve quality of life rather than extend survival and concentrates on relieving physical and psychological distress.

PET – A new imaging technique that detects cancer spread or metastases by looking at how fast radioactive sugar molecules are used by different parts of the body. Cancer cells use sugar at a very high rate so show up brightly on this test.

Radiology – The branch of medicine that involves the use of imaging techniques (such as X-rays, CT Scans and PET scans) to diagnose and stage clinical problems. Interventional radiology is the subspecialty that performs minimally invasive procedures under imaging guidance.

Radiological Palliative Therapies – These are minimally invasive treatments aimed at relieving swallowing difficulties or vomiting. They use real time x-ray control (fluoroscopy) to guide procedures like balloon dilation or stent insertion.

Radiotherapy – A treatment that uses radiation to kill tumour cells and so shrink the tumour. In most cases, it is a palliative treatment but it can be used together with surgery or chemotherapy in a small number of patients as part of an attempt at cure.

RCR – The Royal College of Radiologists is an independent professional body governing training and clinical practice of specialist doctors. The RCR has two faculties:

- Clinical Oncology, which consist of doctors specialising in administration of radiotherapy.
- Clinical Radiology, which consists of doctors specialising in the performance and interpretation of x-rays, CT, PET and other scans as well as undertaking minimally invasive procedures under image guidance ('Interventional Radiology').

RCS – The Royal College of Surgeons of England is an independent professional body committed to enabling surgeons to achieve and maintain the highest standards of surgical practice and patient care. As part of this it supports Audit and the evaluation of clinical effectiveness for surgery.

Stage – The extent to which the primary tumour has spread; the higher the stage, the more extensive the disease.

Staging – The process by which the stage (or extent of spread) of the tumour is determined through the use of various investigations.

Stent – A device used to alleviate swallowing difficulties or vomiting in patients with incurable O-G cancer. It is a collapsible tube that is inserted into the area of narrowing (under either endoscopic or radiological control) that then expands and relieves the blockage.

Surgical resection – An operation whose aim is to completely remove the tumour.

Ultrasound – An imaging modality that uses high frequency sound waves to create an image of tissues or organs in the body.

Urgent (fast-track) referral – This is a referral mechanism used by General Practitioners (GPs) when they suspect the patient may have cancer. It ensures that the patient will be seen faster than would otherwise be the case.

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