National Oesophago-Gastric Cancer Audit 2014

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The National Oesophago-gastric Cancer Audit is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit Programme (NCA). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement, and in particular to increase the impact that clinical audit has on healthcare quality in England and Wales. HQIP holds the contract to manage and develop the NCA Programme, comprising more than 30 clinical audits that cover care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual audits, also funded by the Health Department of the Scottish Government, DHSSPS Northern Ireland and the Channel Islands.

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.

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

The British Society of Gastroenterology is the speciality society of gastroenterologists. It is one of the key partners leading the Audit.

The Royal College of Radiologists is the speciality society of radiologists. It is one of the key partners leading the Audit.

National Oesophago-Gastric Cancer Audit 2014

An audit of the care received by people with Oesophago-Gastric Cancer in England and Wales
2014 Annual Report

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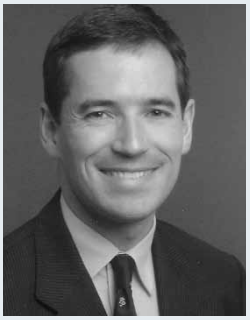


Comment from Mr Richard Hardwick (Consultant Surgeon, Addenbrookes Hospital)

This report covers two years of activity, allowing us for the first time to be more confident about the statistical significance of some of our observations. There has been a slight increase in the proportion of patients being offered a curative treatment plan compared to 2010; it is now up to 37.3 per cent. The reasons for this, however, are unclear. Some of the increase relates to more patients being offered definitive chemoradiotherapy without surgery as treatment for oesophageal cancer. We will need to follow these patients carefully as high quality randomised trials of this strategy are currently unavailable. It would appear that multi-disciplinary teams are increasingly deciding to exclude surgery from radical treatment for patients with squamous of the oesophagus; we do not know whether salvage oesophagectomy is being offered to these patients if the tumour recurs without distant metastases.

Web-based results for all surgeons contributing to this report can be found at either My NHS or the AUGIS website (http://www.augis.org/outcomes-data/). Surgeons remain committed to transparency and openness in publicising their outcomes but feel that it is wrong to ignore the huge contribution that nurses, dieticians, physiotherapists, oncologists, intensivists and radiologists make to the successful outcome of complex operations.

Surgeons alone are not responsible for the excellent results reported in this audit and we will continue to argue for team-based outcome publication. Surgery is much safer than it was ten years ago thanks to the creation of these dedicated teams and centralisation of surgery to bigger hospitals. Pleasingly, this is not as a consequence of rejecting elderly patients for surgery; risk-adjusted rates of surgery for those >80 years are the same as for those <80 yrs. Many clinicians are worried that a "naming and shaming" culture in the NHS may encourage risk-aversion behaviour whereby surgeons avoid operating on high-risk patients and hence deny them the possibility of cure. The Audit will endeavour to monitor this.

As surgical mortality has fallen our focus should move to other outcome indicators such as complication rates and completeness of cancer resection. Nearly 9.0 per cent of patients having a gastrectomy have an incomplete resection of the primary tumour and this has not changed since 2010. We need to examine the reasons for this in more detail and find ways of improving; greater use of intra-operative frozen-section assessment of resection margins may be one solution.

Minimally invasive surgical techniques continue to grow in popularity and we are beginning to see a shorter length of stay for patients treated this way compared with open surgery. However, until there is evidence from randomised prospective trials it is difficult to advise patients about the relative merits or disadvantages of these approaches and Teams must ensure that their patient consent process reflects this uncertainty and continue to audit their outcomes prospectively. As good quality trials become available we must learn how to successfully recruit patients into them otherwise we will be none the wiser in another ten years time.

Executive summary

1. The aim of the National Oesophago-Gastric Cancer Audit (NOGCA) is to measure the quality of care received by patients with oesophago-gastric (O-G) cancer and high grade dysplasia of the oesophagus in England and Wales.

2. The Audit is based on prospectively-collected data on patients diagnosed with high grade oesophageal dysplasia (HGD) or with invasive epithelial cancer of the oesophagus, gastro-oesophageal junction (GOJ) or stomach (ICD-10 codes C15 and C16) and were aged 18 years or over.

3. In this report, we focus on patients managed with curative intent considering both treatment options and outcomes, including management of early cancers and cancers in the elderly. This complements the 2014 Progress Report which focused on palliative treatment of O-G cancer[1].

4. The data collection period (based on date of diagnosis) for this report was 1 April 2011 to 31 March 2013, with data on follow up therapy (such as surgery) entered subsequently without date restrictions. Data on 22,832 patients with an O-G tumour were submitted. The overall case-ascertainment rate for newly diagnosed O-G cancer patients for the two year rolling cohort is 78.6 per cent. For surgical resections, the overall case-ascertainment rate for the two year period is 97.8 per cent.

5. The percentage of O-G cancer patients managed with curative intent was 37.0 per cent. The proportion of oesophageal squamous cell cancers (SCC) and upper oesophageal adenocarcinomas managed curatively has increased from 31.0 per cent to 35.0 per cent and from 28.0 per cent to 32.0 per cent, respectively. This reflects the increased use of definitive chemoradiotherapy and endoscopic mucosal resection in treating these cancers. Across Strategic Clinical Networks (SCNs) there is significant variation in the proportion of patients with oesophageal SCC managed with definitive oncology versus surgery.

6. Data was submitted for 5,396 surgical resections, 95.0 per cent of these had planned curative intent. Outcomes after curative surgery continue to improve. This report shows that 90 day mortality has fallen to 4.4 per cent (95.0 per cent CI 3.6-5.1) for oesophagectomies, and to 4.5 per cent (95.0 per cent CI 3.6-5.6) for gastrectomies.

7. Post-operative complications remain frequent, occurring after a third of oesophagectomies and a fifth of gastrectomies. Overall lymph node yield has improved for both oesophagectomies and gastrectomies. The percentage of patients with positive longitudinal resection margins after oesophagectomy has fallen significantly since the 2010 Annual Report, from 6.4 per cent to 3.7 per cent.

8. For the first time the NOGCA dataset was linked to the National Radiotherapy Dataset (RTDS). 90.6 per cent of records were successfully linked. 59.7 per cent of patients planned to receive definitive chemoradiotherapy for oesophageal cancer followed a treatment regimen recommended by the Royal College of Radiologists (RCR), and 46.4 per cent of those treated with curative radiotherapy alone for oesophageal cancer did.

9. This report analysed the treatment planning and outcomes for elderly patients. Overall 3,919 (24.1 per cent) of oesophageal cancers and 2,141 (32.8 per cent) of gastric cancers are diagnosed in patients over 80. Patients over 80 years old were more likely to be diagnosed after an emergency admission (21.2 per cent vs 11.4 per cent). However, there was no difference in the proportion of elderly patients managed with curative intent after adjusting for known confounding factors such as performance status and comorbidities.

10. Overall 5.4 per cent of O-G cancers were diagnosed at an early stage. 74.7 per cent of these patients were managed with curative intent, with surgery most commonly chosen as the main treatment modality but 26.6 per cent of oesophageal and 11.7 per cent of gastric cancers were managed with endoscopic mucosal resection alone.

Recommendations

1. Case-ascertainment for surgical cases is excellent, but the overall case-ascertainment has fallen. Trusts need to tighten up local protocols to ensure these patients are submitted to the audit.

2. Use of minimally invasive and hybrid surgery continues to rise. There is some evidence that patients undergoing minimally invasive surgery tend to have a shorter length of stay post-operatively, compared to patients having open surgery. But further research is needed to assess whether they recover more quickly overall compared to those undergoing open surgery.

3. As surgical mortality continues to fall, increased focus should go on other potential quality indicators such as longitudinal margin status, length of stay and complication rates. These outcomes should be monitored prospectively at a Trust level.

4. Nearly one in ten patients having a gastrectomy has incomplete resection of their cancer (a positive longitudinal margin). This has not changed since the 2010 report. All Surgical Centres should know their rate for this quality indicator and consider ways that it can be reduced.

5. Further investigation needs to go into the variation in dosing regimens used for definitive chemoradiotherapy, to see whether this variation is due to an issue with data quality or truly represents lack of adherence to published guidelines.

6. Nationwide there was no difference in proportions managed with curative intent according to age, after adjusting for known confounders. But at a local Strategic Clinical Network (SCN) level, there did appear to be significant variation in the proportion of patients aged 70 years or over managed with curative intent. It is important to ensure all patients are considered for curative treatment options based on both the extent of the disease and also patient factors (e.g. patient preference and comorbidities), irrespective of their age.

7. Across SCNs there was significant variation in the proportion of cancers diagnosed at an early stage. This should be investigated at a local level, with Networks focusing on increasing the proportion of patients diagnosed at an early stage, as these patients are significantly more likely to be managed with curative intent. Where patients are diagnosed early, Trusts should consider referral to centres with endoscopic expertise in removal of such lesions.

8. Data quality needs to be reviewed at a trust level, specific fields that appear to be affected by issues with data quality have been highlighted in the Annex. It is key that any queries regarding correct response to each field are checked with a clinician in order to optimise data quality, issues were most common in the oncology dataset.

1. Introduction

The National Oesophago-Gastric Cancer Audit (NOGCA) 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 five 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 and high grade dysplasia of the oesophagus 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 will focus on patients managed with curative treatment intent considering both treatment options and outcomes. This complements the 2014 Progress Report which focused on palliative treatment of O-G cancer. We will go on to investigate patterns of treatment in patients diagnosed with disease at an early stage and cancers diagnosed in the elderly population.

Key indicators used for this report were derived from best evidence and standards on the management and treatment of O-G Cancer (Table 1 1).

Service organisation and policy in England and Wales

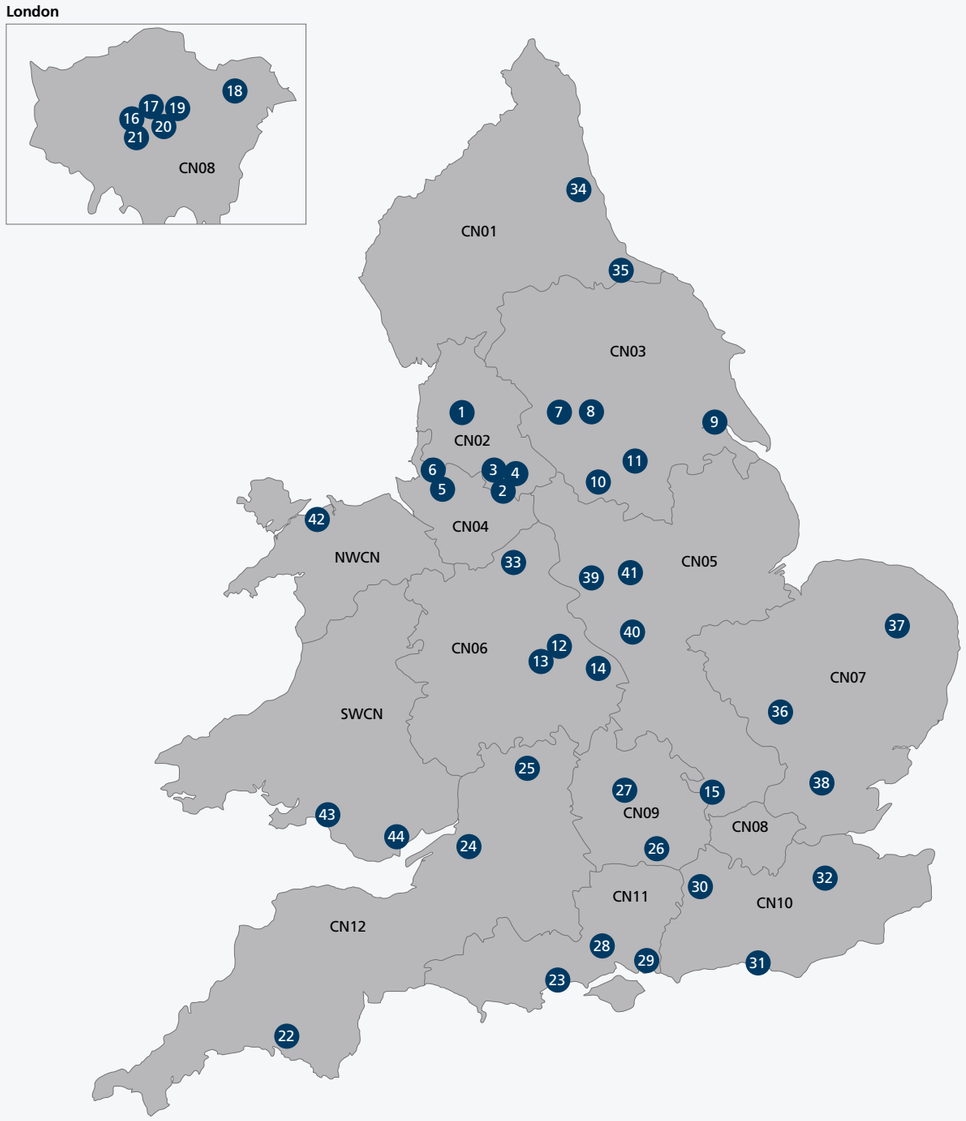
The organisation of cancer services in England changed during the data collection period for this report. As a result the cancer networks have been replaced by a new governing structure, the Strategic Clinical Networks (NHS Commissioning Board, 2012) (see 2014 Progress Report for further details)[1]. It is the responsibility of SCNs to provide clinical and managerial support to Clinical Commissioning Groups (CCGs), Health and Wellbeing Boards (HWBs) and NHS England in order to improve regional healthcare (DoH & PHE, 2013). Their geographical boundaries are matched to NHS England Clinical Senate areas (DoH & PHE, 2013), as shown in Figure 1-1.

We report here at the Strategic Clinical Network level in response to these national organisational changes. Throughout the report we consider two separate networks for Wales (North and South Wales).

Table 1.1
Key indicators

Domain	Indicator
Curative Surgery	% Patients undergoing curative oesophagectomy/gastrectomy who receive additional oncological treatment. Complications of surgery - % 30 and 90 day mortality - % overall complication rate after surgery Effectiveness of surgery - % adequate lymph node resection - % positive resection margins Length of stay in hospital
Elderly patients	% patients over 70 managed with curative intent
Early diagnosis	% patients diagnosed at an early stage

Figure 1-1
Strategic Clinical Networks in England and Wales 2014



West Hertfordshire Hospitals NHS Trust RWG sits with East of England Strategic Clinical Network CN07

Figure 1-1
Strategic Clinical Networks in England and Wales 2014

Cancer Centres

ID	Code	Name
1	RXN	Lancashire Teaching Hospitals NHS Foundation Trust
2	RM2	University Hospital of South Manchester NHS Foundation Tust
3	RM3	Salford Royal Hospitals NHS Foundation Trust
4	RW3	Central Manchester and Manchester Children's University Hospitals NHS Trust
5	RBQ	The Cardiothoracic Centre – Liverpool Heart and Chest NHS Trust
6	REM	Aintree University Hospitals NHS Foundation Trust
7	RAE	Bradford Teaching Hospitals NHS Foundation Trust
8	RR8	Leeds Teaching Hospitals NHS Trust
9	RWA	Hull and East Yorkshire Hospitals NHS Trust
10	RHQ	Sheffield Teaching Hospitals NHS Foundation Trust
11	RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust
12	RR1	Heart of England NHS Foundation Trust
13	RRK	University Hospital Birmingham NHS Foundation Trust
14	RKB	University Hospitals Coventry and Warwickshire NHS Trust
15	RWG	West Hertfordshire Hospitals NHS Trust
16	RYJ	Imperial College Healthcare NHS Trust
17	RRV	University College London Hospitals NHS Foundation Trust
18	RF4	Barking, Havering and Redbridge Hospitals NHS Trust
19	R1H	Barts Health NHS Trust
20	RJ1	Guy's and St Thomas' NHS Foundation Trust
21	RPY	The Royal Marsden NHS Foundation Trust
22	RK9	Plymouth Hospitals NHS Trust
23	RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
24	RA7	University Hospitals Bristol NHS Foundation Trust
25	RTE	Gloucestershire Hospitals NHS Foundation Trust
26	RHW	Royal Berkshire NHS Foundation Trust
27	RTH	Oxford University Hospitals NHS Trust
28	RHM	Southampton University Hospitals NHS Trust
29	RHU	Portsmouth Hospitals NHS Trust
30	RA2	Royal Surrey County Hospital NHS Trust
31	RXH	Brighton and Sussex University Hospitals NHS Trust
32	RWF	Maidstone and Tunbridge Wells NHS Trust
33	RJE	University Hospital of North Staffordshire NHS Trust
34	RTD	The Newcastle Upon Tyne Hospitals NHS Trust
35	RTR	South Tees Hospitals NHS Trust
36	RGT	Cambridge University Hospitals NHS Foundation Trust
37	RM1	Norfolk and Norwich University Hospital NHS Trust
38	RQ8	Mid Essex Hospital Services NHS Trust
39	RTG	Derby Hospitals NHS Foundation Trust
40	RWE	University Hospitals of Leicester NHS Trust
41	RX1	Nottingham University Hospitals NHS Trust
42	7A1	Betsi Cadwaladr Health Board
43	7A2/3	Abertawe Bro Morgannwg University Health Board*
44	7A4	Cardiff and Vale Health Board

*surgery for this Health Board is currently being undertaken at 2 units: Princess of Wales Hospital, Bridgend and Morriston Hospital, Swansea.

Strategic Clinical Networks

Code	Name	Code	Name
CN01	Northern England	CN08	London
CN02	Greater Manchester, Lancashire and South Cumbria	CN09	Thames Valley
CN03	Yorkshire and the Humber	CN10	South East Coast
CN04	Cheshire and Merseyside	CN11	Wessex
CN05	East Midlands	CN12	South West Coast
CN06	West Midlands	SWCN	South Wales
CN07	East of England	NWCN	North Wales

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 (O-G) cancer (ICD-10 codes C15 and C16). Patients were eligible for inclusion if they were diagnosed in an NHS hospital in England or Wales between 1 April 2011 and 31 March 2013, and were aged 18 years or over. This information was 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.

Throughout this report (unless highlighted differently), we are reporting on two years' worth of data.

As previously noted in the 2014 Progress Report, the dataset was slightly revised as of 1 April 2012 (please see **the Progress Report**[1] for details of changes). A copy of the clinical datasheet and the data manual can be downloaded from the Audit website at: www.hscic.gov.uk/og[2].

Data collection and linkage to other datasets

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 vast majority of patients in the Audit had received treatment in the NHS only.

Data were submitted by English NHS services, either by extraction and uploading of data already collected at a local level on their information system via a 'csv' file or data was manually entered via a secure web-based data entry form. Welsh data was provided by the Cancer Network Information System Cymru (CaNISC), this dataset did not record complication rates, as a result this data is not reported on for Welsh patients.

The Audit data was linked to Hospital Episode Statistics (HES) in England, Office for National Statistics (ONS) mortality data and the Radiotherapy Data Set (RTDS) prior to analysis.

Statistical analysis of clinical data

The results of the Audit are presented at different levels: by Strategic Clinical Network level or as two separate networks for Wales (North and South), and at NHS trust level. Regional differences in England are shown using the 12 Strategic Clinical Networks that existed on 1 April 2014, and for Wales as two Networks. To show differences between the geographical regions, Network rates and 95.0 per cent confidence intervals (CI) are plotted against the overall rate, with Networks ordered according to the number of patients on whom data were submitted or estimated case- ascertainment. English patients were allocated to the Strategic Clinical Network based on their NHS trust of diagnosis and not by region of residence, Welsh patients were similarly allocated to either North or South Wales. Averages and rates are presented with 95.0 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, sex, and disease severity. 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 statistical tests are two-sided and p-values 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 rates for post-operative outcomes for each NHS organisation in England and Wales, 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)[3]. 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 post-operative complication rates for NHS organisations[4].

The variation in adjusted complication rates of the NHS Trusts in England and Wales was examined using a funnel plot[5]. 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 95.0 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 one in 500 chance).

3. Participation

At the end of the data collection period, clinical data had been submitted by 153 (99.0 per cent) of the 154 individual English NHS Trusts that provided **oesophago-gastric** (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 Network Information System Cymru (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 2013. 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 **22,832 patients with O-G tumour data submitted in England and Wales** (Table 3-1).

Table 3-1
Data forms submitted by year, after removal of duplicates, for England and Wales

	2011/12	2012/13	Total
Tumour	11,836	10,996	**22,832**
Oncology	5,263	5,761	**11,024**
Endo-Palliative therapy (including stenting)	1,655	1,691	**3,346**
Surgery	2,607	2,789	**5,396**
Pathology	2,522	2,456	**4,978**

Overall case-ascertainment

For the data collection period based on patients diagnosed between April 2011 to March 2013, English NHS Trusts submitted information to the Audit on 21,638 tumour records and 5,224 surgical records. The Audit used Hospital Episode Statistics (HES) to estimate how many of the patients diagnosed between 1 April 2011 and 31 March 2013 were submitted by English NHS Trusts. The estimate was based on the activity data from HES (Hospital Episode Statistics) that was linked to the Audit dataset. 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 27,542 for the 2011/13 data collection period.

The overall case-ascertainment for England for newly diagnosed O-G cancer patients for the two year rolling cohort is 78.6 per cent.

For surgical resections, there were 5,344 surgical resections recorded in the HES dataset. This gives an **overall case-ascertainment rate for O-G resections in England for the two year period of 97.8 per cent.**

Completeness of submitted data

Data completeness is a key issue in ensuring fair comparisons across NHS Trusts and is of particular importance for risk-adjustment when comparing outcomes. Selected items are still non-mandatory or include the option of 'unknown' in the National Oesophago-Gastric Cancer Audit (NOGCA) and for these the level of data completeness across NHS Trusts was more variable (Annex 4).

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. It is unclear whether this was because the data were not available or was a failure to input the data. 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 their care networks, including participation in the national Audit.

4. Treatment Planning

Once a diagnosis of **oesophago-gastric** (O-G) cancer is made, further staging investigations need to be done to assess whether the disease is amenable to curative treatment. This decision will take account of not only the extent of the disease but also patient factors (e.g. patient preference and comorbidities).

Curative treatment options include:

1. Surgery alone
2. Perioperative chemotherapy and surgery
3. Neoadjuvant chemotherapy and surgery
4. Definitive chemoradiotherapy
5. Endoscopic resection (for T1 tumours only).

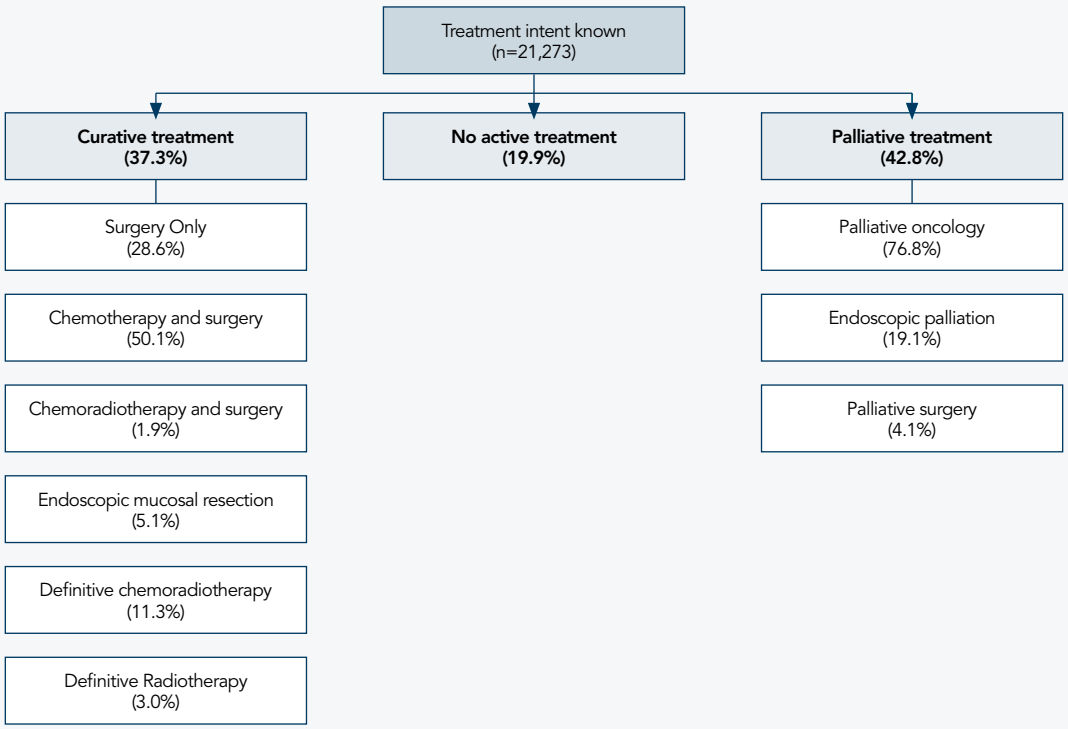
Palliative therapy for O-G cancer should focus on improving quality of life. Options include: endoscopic stenting for oesophageal cancer, chemotherapy for oesophageal and gastric cancer, bypass surgery for distal gastric cancers and best supportive care for both oesophageal and gastric cancer.

Treatment Modality

Overall treatment plan intent was completed for 21,273 (93.1 per cent) patients in the Audit, in England and Wales. Coding of treatment intent was missing or inconsistent for a small proportion of patients, notably some patients managed with a palliative treatment who were incorrectly coded with the modality 'no active treatment (supportive care)', patients recorded as receiving definitive radiotherapy instead of palliative oncology, and patients reported as receiving adjuvant oncology when they had no corresponding surgical record. Issues with data quality in particular fields are examined further in Annex 7.

Where treatment intent was known **37.3 per cent (95.0 per cent CI 36.7-38.0) of patients were managed with curative intent** (Figure 4-1), compared to 35.9 per cent (95.0 per cent CI 35.2-36.6) in the 2010 National Oesophago-Gastric Cancer Audit (NOGCA) Report[6]. But for the 14.0 per cent of patients diagnosed as a result of an emergency admission only 17.0 per cent were managed with curative treatment intent. This highlights the importance of trying to reduce the proportion of patients diagnosed with O-G cancer in this manner.

Figure 4-1
Treatment intent and modality for O-G cancer patients, for England and Wales



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, than patients with upper oesophageal and gastric cancers (Table 4-1). Since the 2010 NOGCA report, the largest change in the proportion managed curatively has been in the management of oesophageal squamous cell cancer (SCC) (up from 31.0 per cent to 35.0 per cent) and upper oesophageal adenocarcinomas (up from 28.0 per cent to 32.0 per cent)[6].

There is some evidence to support the use of definitive chemoradiotherapy to treat oesophageal SCC but high quality prospective randomised controlled trials are urgently needed to compare this to standard therapy. In addition, the role of salvage oesophagectomy (resection after loco-regional tumour recurrence after definitive chemoradiotherapy) is unclear. Despite these uncertainties, multidisciplinary teams are offering definitive chemoradiotherapy more frequently than 3 years ago. One potential explanation for these changes is that as the patient population ages, we are seeing more patients with multiple co-morbidities who are not deemed fit for surgery, but are considered fit enough to have definitive chemoradiotherapy. Another potential explanation for the changing practice is the possibility of patient choice impacting on treatment plan, but the audit does not collect information on this.

Table 4-1
Treatment intent by tumour type, for England and Wales

	Oesoph SCC	Oesoph Adenoca Upper/Mid	Oesoph Adenoca Lower/SI	GOJ SII/SIII	Stomach	Total
Curative %	34.9	31.7	41.7	41.9	33.6	**37.3**
Palliative %	65.1	68.3	58.3	58.1	66.4	**62.0**
Total	**4,290**	**1,269**	**6,902**	**2,701**	**6,111**	**21,273**
Missing	**366**	**120**	**441**	**200**	**432**	**1,559**

Oesoph = Oesophageal **SCC** = Squamous cell cancer **Adenoca** = Adenocarcinoma **GOJ** = Gastro-oesophageal junction **S1, SII, SIII** = Siewert I, II, III

Planned curative therapy

The type of curative therapy planned according to tumour site is shown in Table 4-2.

Among patients managed with curative intent, surgery with or without adjunctive oncological therapy was the most common curative treatment planned for all oesophageal adenocarcinomas and gastric cancers. But for oesophageal SCC use of definitive chemo radiotherapy has risen significantly since 2010 NOGCA report, from 31.0 per cent to 39.0 per cent[6]. There was also an increase in the use of endoscopic resection as a curative treatment option over this time period, from 2.0 per cent to 5.0 per cent (n=371)[6].

Key Findings on Treatment Plan

Overall 37.0 per cent of patients managed with curative intent

Since the 2010 NOGCA report the following changes have been seen:

Choice of curative treatment for oesophageal SCC has shifted further in favour of use of definitive chemoradiotherapy, increasing from 31.0 per cent to 39.0 per cent.

Use of EMR as a choice of curative treatment has risen from 2.0 per cent to 5.0 per cent.

Table 4-2
Curative treatment modalities used, by tumour type, for England and Wales

	Oesoph SCC	Oesoph Adenca Upper/Mid	Oesoph Adenca Lower/SI	GOJ SII/SIII	Stomach
Curative					
Surgery Alone %	13.0	35.0	22.0	21.0	50.0
Radiotherapy Alone %	8.0	5.0	3.0	1.0	1.0
Chemotherapy and Surgery %	32.0	40.0	60.0	68.0	43.0
Definitive Chemoradiotherapy %	39.0	9.0	7.0	5.0	2.0
Chemoradiotherapy and Surgery %	5.0	1.0	2.0	1.0	1.0
Endoscopic Mucosal Resection %	3.0	10.0	7.0	4.0	4.0
Total	**1,497**	**402**	**2,879**	**1,132**	**2,050**
Missing	**152**	**43**	**250**	**105**	**116**

Oesoph = Oesophageal **SCC** = Squamous cell cancer **Adenoca** = Adenocarcinoma **GOJ** = Gastro-oesophageal junction **S1, SII, SIII** = Siewert I, II, III

5. Curative surgery

More than a third of patients were planned to have treatment with curative intent, and most of these patients received surgery which was frequently combined with chemotherapy. Over time, the types of surgical procedures performed and the surgical approach used has changed, with an increasing use of minimally invasive surgical techniques.

There are three main questions regarding oesophago-gastric cancer surgery:

- Is there a chance of cure with an operation?
- Is the patient fit enough to survive surgery?
- 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 straightforward.

Overall, **5,396 surgical records** were submitted for patients diagnosed between 1 April 2011 and 31 March 2013, for England and Wales. Of these 5,133 (95.0 per cent) had a curative surgical intent, 233 (4.3 per cent) had a palliative surgical intent, and for 38 (0.7 per cent) surgical intent was unknown.

Patient Characteristics

Where details on both treatment modality and planned intent were known, we report on patient characteristics by planned surgical modality in Table 5-1.

Patients undergoing surgery with curative intent were younger and fitter than overall group, as expected. But 3.1 per cent of oesophagectomies and 14.2 per cent of gastrectomies were performed in patients aged 80 or over (these figures have increased from 2.0 per cent and 11.0 per cent reported in the 2010 National Oesophago-Gastric Cancer Audit (NOGCA) report)[6]. The proportion of patients which one or more co-morbidities was still relatively high, with over 40.0 per cent of patients who had an oesophagectomy or gastrectomy having one or more comorbidities.

Patients receiving oncological therapy in combination with surgery were generally fitter than those receiving surgery alone, with a higher proportion of patients having a performance status of 0 or 1 and ASA 1 or 2. Compared to 2010 NOGCA report patients considered for surgery alone were less fit than previously seen, with the proportion of oesophagectomy patients having a performance status of 0 or 1 falling from 91.0 per cent to 81.0 per cent, similarly for gastrectomies it fell from 83.0 per cent to 76.0 per cent[6]. A similar trend was seen when considering ASA grade. This suggests surgeons are increasingly considering less fit patients for curative surgery. Similar changes were seen when looking at the cohort of patients considered for surgery in combination with oncological therapy.

Table 5-1
Summary of characteristics of O-G cancer patients who had a planned curative oesophagectomy or gastrectomy, analysed according to planned treatment modality, for England and Wales

		Type of Operation	
		Oesophagectomy (n=3,050)*	Gastrectomy (n=1,848)*
Surgery Only			
Number of patients		**676**	**842**
Patient age (years)	Median	69	76
	Inter Quartile Range	62 to 76	69 to 80
Performance Status %	0 or 1	81.0	76.0
ASA Grade %	I or II	70.0	61.0
Surgery and chemotherapy			
Number of patients		**1,968**	**872**
Patient age (years)	Median	65	68
	Inter Quartile Range	58 to 70	59 to 73
Performance Status %	0 or 1	91.0	89.0
ASA Grade %	I or II	78.0	76.0
Surgery and chemoradiotherapy			
Number of patients		**67**	**13**
Patient age (years)	Median	63	55
	Inter Quartile Range	57 to 70	44 to 65
Performance Status %	0 or 1	92.0	92.0
ASA Grade %	I or II	76.0	92.0

* This figure represents the total number of patients who had a curative resection. The Table goes on to analyse the patients characteristics of those planned to receive surgery or surgery with chemotherapy alone or chemoradiotherapy. Some additional patients who went on to have a curative resection were initially planned to have an EMR or had their treatment plan missing. Therefore, the numbers reported by planned treatment modality differ from the total number of procedures.

Surgical Approach

21.4 per cent of all patients diagnosed with O-G cancer were managed with curative surgery. Overall 3,050 oesophagectomies and 1,848 gastrectomies were performed with curative intent. Where surgery was performed with curative intent, further analysis was done looking at the types of procedures performed (Table 5-2). The majority of oesophagectomies were performed via the transthoracic approach, with the 2- phase Ivor Lewis procedure being the most frequent (78.9 per cent) and only 110 (3.6 per cent) procedures done via transhiatal approach. As expected for gastric resections, most procedures were total or distal gastrectomies. The rate of open-shut procedures has improved since the first audit, falling from 5.0 per cent to 4.2 per cent of all procedures done with curative intent (although this difference was not statistically significant)[6].

Table 5-2
Surgical procedures performed where pre-operative intent was curative by type and site of tumour, for England and Wales

Type of Operation	Oesophageal SCC	Oesophageal ACA Mid/Upper	Oesophageal ACA Lower/SI	SII/SIII	Stomach	Total
Oesophagectomy						
Left Thor-abdominal	59	27	209	77	NA	**373**
2-Phase (Ivor-Lewis)	352	130	1,497	413	NA	**2,406**
3-Phase (McKeown)	55	20	68	16	NA	**161**
Transhiatal	18	7	61	20	NA	**110**
Gastrectomy						
Total	NA	NA	41	214	608	**869**
Extended Total	NA	NA	14	84	31	**130**
Proximal	NA	NA	<5	<5	32	**39**
Distal	NA	NA	<5	0	741	**744**
Other	NA	NA	<5	<5	59	**66**
Other Procedure						
Open-Shut	24	<5	79	44	63	**214**
Bypass	<5	<5	<5	0	16	**21**
Total	**519**	**191**	**1,975**	**877**	**1,571**	**5,133**

Surgical approach was known for 91.2 per cent of oesophagectomies and 97.7 per cent of gastrectomies. Overall 14.4 per cent of oesophagectomies were fully minimally invasive and a further 27.1 per cent were hybrid operations, while 15.9 per cent of gastrectomies were minimally invasive (Table 5-3). The use of MI surgery has increased since the 2010 Audit report when only 30.0 per cent of oesophagectomies were MI/hybrid and only 13.0 per cent of gastrectomies were MI[6].

Table 5-3
Surgical approach used for curative surgical resections by type of procedure, for England and Wales

Oesophagectomy					
	Left Thor-abdominal	2-Phase	3-Phase	Transhiatal	Overall
Open	354	1,113	65	97	1,629
Hybrid (includes converted)	8	773	12	0	753
Minimally invasive (MI) (includes converted)	7	321	66	6	400
Total	**369**	**2,167**	**143**	**103**	**2,782**
Percentage MI/Hybrid	**4.1**	**48.6**	**54.6**	**5.8**	**41.5**
Data Incomplete	4	239	18	7	268

Gastrectomy			
	Total/Extended total	Subtotal/partial	Overall
Open	867	652	1,519
Minimally invasive (MI) (includes converted)	106	181	287
Total	**973**	**833**	**1,806**
Percentage MI	**10.9**	**21.7**	**15.9**
Data Incomplete	26	16	42

Use of oncological treatments in patients undergoing curative resection

Neoadjuvant and perioperative chemotherapy offers survival benefit compared to surgery alone for locally advance oesophageal and gastric cancers[7].

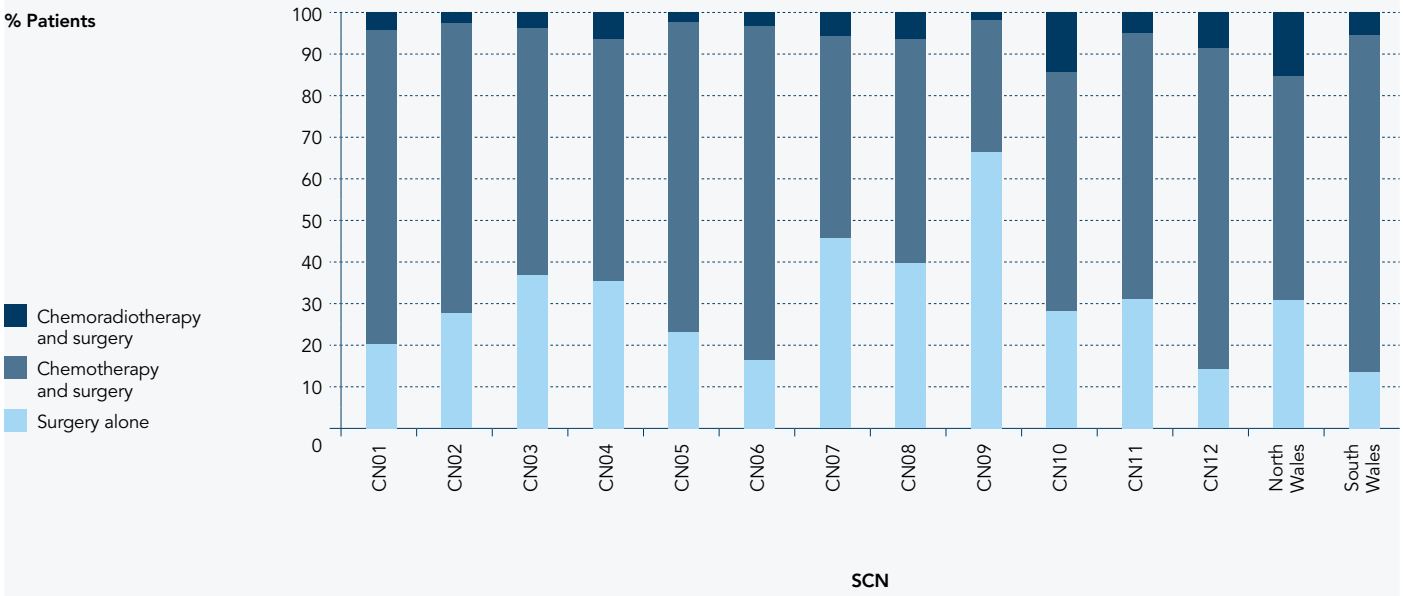
Table 5-4 summarises the use of oncology treatment in patients who underwent a curative oesophagectomy or gastrectomy.

Table 5-4
Summary of oncological treatment received by patients who had a curative oesophagectomy or gastrectomy, for England and Wales

Treatment	Oesoph SCC	Oesoph ACA Upper/Mid	Oesoph ACA Lower/SI	GOJ SII/SIII	Stomach	Total
No. patients	492	186	1,895	833	1,492	**4,898**
No. patients who received oncology treatment in addition to surgery	317	99	1,207	532	586	**2,741**
(% surgical patients)	(64.0)	(53.0)	(64.0)	(64.0)	(39.0)	**(56.0)**
Neoadjuvant only %	86.0	69.0	79.0	76.0	62.0	**75.0**
Adjuvant only %	4.0	6.0	5.0	5.0	20.0	**8.0**
Combined neoadjuvant and adjuvant %	10.0	25.0	16.0	20.0	18.0	**17.0**

Across Strategic Clinical Networks (SCNs) there was considerable variation in the proportion of patients with locally advanced disease (N=1, 2 or 3) who had a curative oesophagectomy or gastrectomy, and received any additional oncology treatment (Figure 5-1).

Figure 5-1
Proportion of patients who had locally advanced disease (N1/2/3) who were managed with a curative oesophagectomy or gastrectomy, and received any additional oncological treatment, for England and Wales



Key findings on curative surgery

Since the 2010 NOGCA report the following changes have been seen:

Increase in the proportion of oesophagectomies and gastrectomies done in patients over the age of 80 years.

Patients undergoing curative surgery were slightly less fit than those reported in the 2010 report, with worse performance status and ASA grade.

Use of MI surgery has increased, with 14.4 per cent of oesophagectomies fully MI and a further 27.1 per cent hybrid operations, and 15.9 per cent of gastrectomies fully MI.

6. Outcomes of O-G cancer curative surgery

In this chapter, we go on to examine the outcomes associated with curative surgery for oesophago-gastric (O-G) cancer in England and Wales. We therefore report on the following indicators: mortality (30 and 90 day), post-operative complication rates, and length of stay. In considering efficacy of surgery we also look at lymph node resections and resection margins.

By linking the audit data to HES (Hospital Episode Statistics) we estimate that the audit achieved 97.8 per cent case-ascertainment for cases managed with surgical resections in England. As a result it is unlikely that results from this audit are significantly affected by selection bias.

Post-operative Outcomes

Post-operative mortality

Using NOGCA data we looked at 30 and 90 day post-operative mortalities, in England and Wales (Table 6-1). Both the 30 and 90 day mortalities have fallen since the 2010 National Oesophago-Gastric Cancer Audit (NOGCA) report, when 30 day mortality was 3.8 per cent for oesophagectomies and 4.5 per cent for gastrectomies, and 90 day mortality was 5.7 per cent for oesophagectomies and 6.9 per cent for gastrectomies[6].

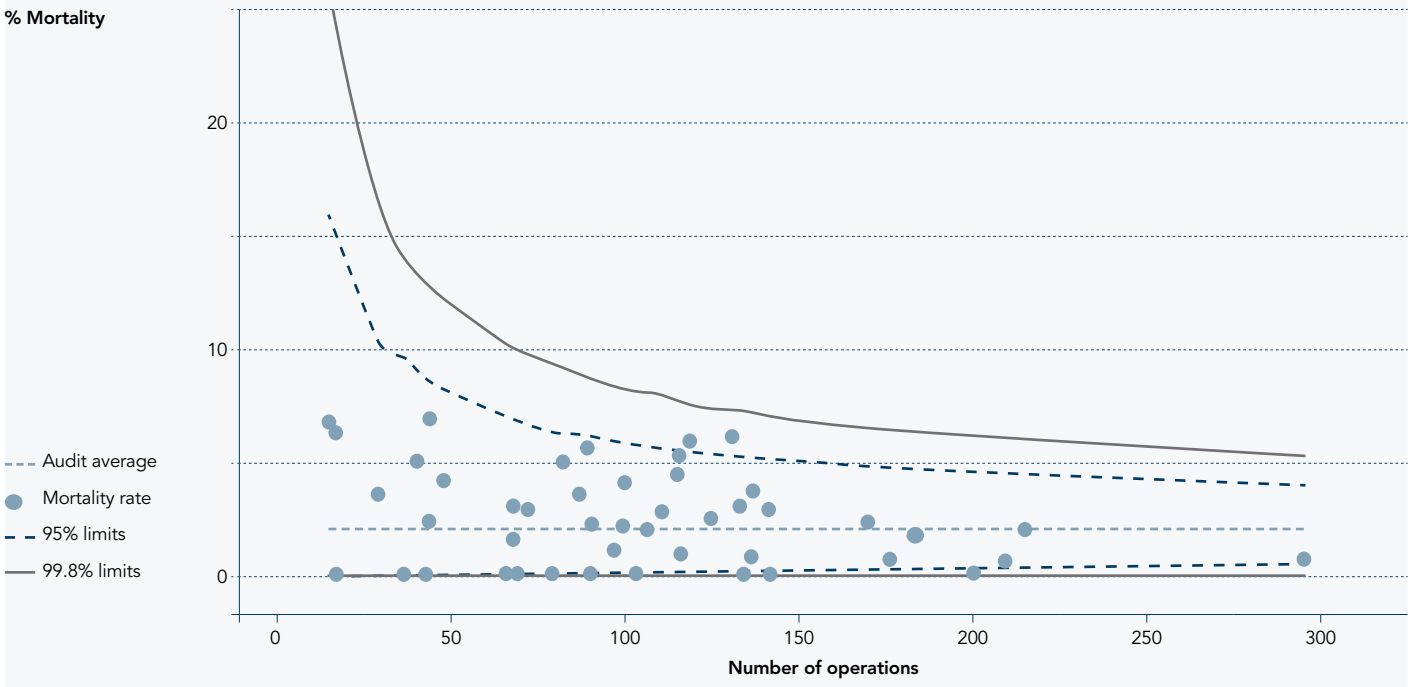
The 30 and 90 day mortality rates were explored at a trust level, and outcomes are shown in funnel plots after adjusting for age, sex, performance status, comorbidities, TNM stage, ASA grade and type of procedure (Figure 6-1, Figure 6-2).

Table 6-1
Unadjusted post-operative mortality for curative surgery by type of procedure, for England and Wales

	Oesophagectomy (n=3,050)		Gastrectomy (n=1,848)	
	Rate (%)	95% CI	Rate (%)	95% CI
30-Day mortality	2.4	1.9-3.0	2.3	1.6-3.1
90-Day mortality	4.4	3.6-5.1	4.5	3.6-5.6

Figure 6-1
Funnel plot showing 30-day mortality by trust (both observed and adjusted), for curative oesophagectomies and gastrectomies combined, for England and Wales.

Observed 30 day mortality rate by Trust



Adjusted 30 day mortality rate by Trust

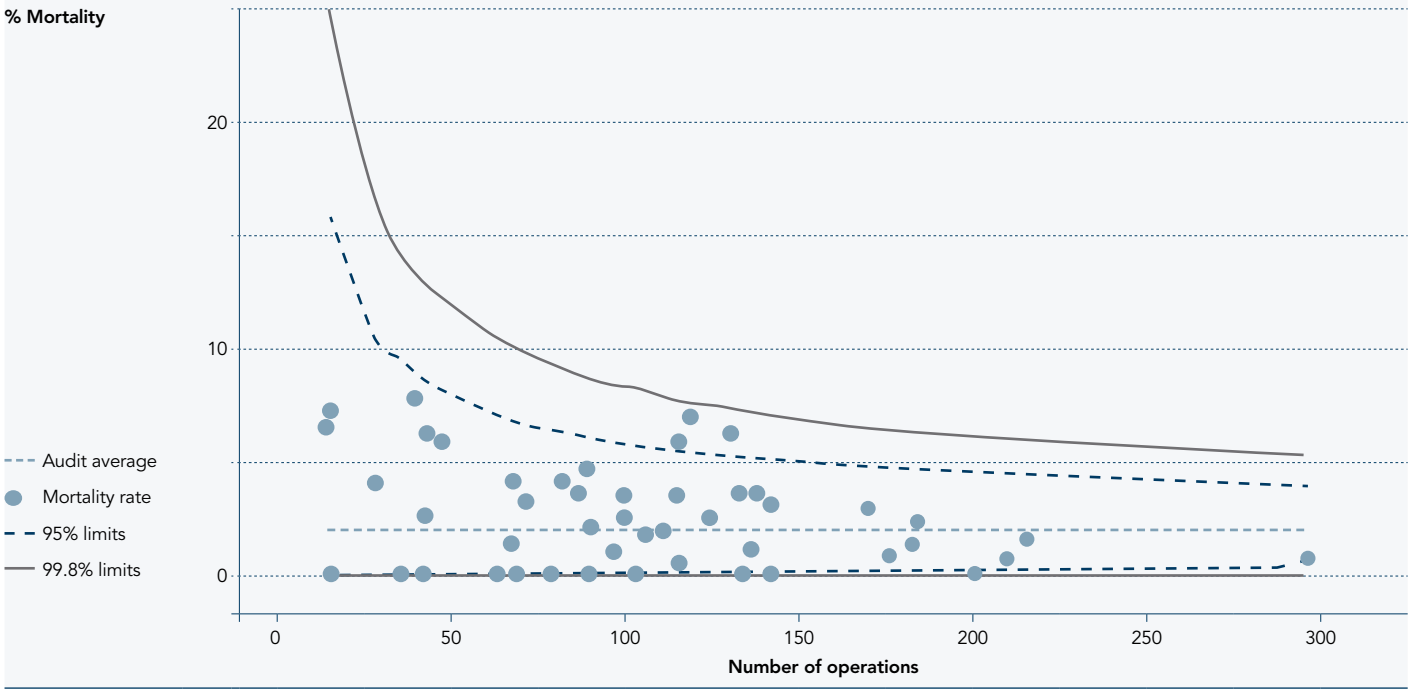
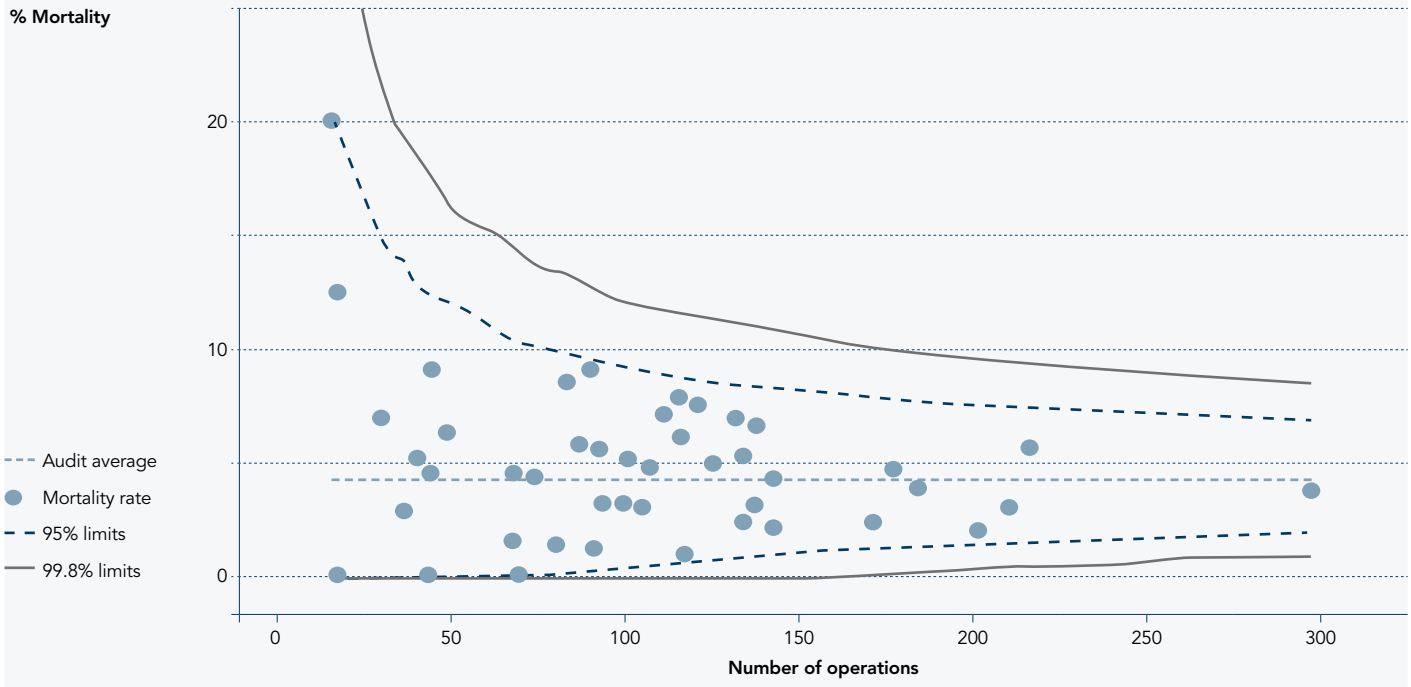
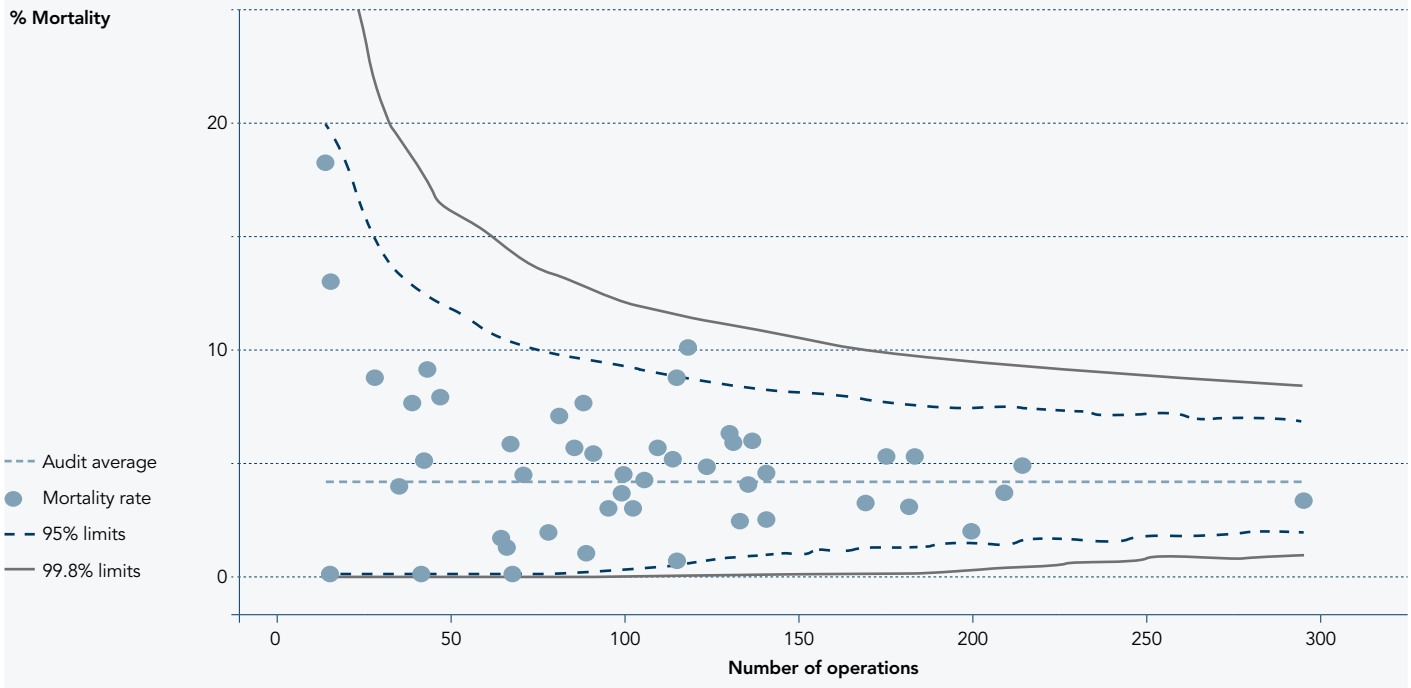


Figure 6-2
Funnel plot showing 90-day mortality by Trust (both observed and adjusted), for curative oesophagectomies and gastrectomies combined, for England and Wales.

Observed 90 day mortality rate by Trust



Adjusted 90 day mortality rate by Trust



Variations in mortality according to surgical approach

Further analysis was done to look for variations in mortality according to surgical approach used (Table 6-2 and Table 6-3). This revealed no significant differences in mortality rate according to surgical approach used.

Table 6-2
Unadjusted post-operative mortality after curative oesophagectomy by surgical approach, for England and Wales

	Open (n=1,630)		Hybrid (n=753)		Minimally Invasive (n=400)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
30-Day mortality	2.0	1.3-2.8	2.5	1.5-3.9	4.0	2.3-6.4
90-Day mortality	4.1	3.2-5.2	4.2	2.9-5.9	5.3	3.3-7.9

Table 6-3
Unadjusted post-operative mortality after curative gastrectomy by surgical approach, for England and Wales

	Open (n=1,524)		Minimally Invasive (n=287)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
30-Day mortality	2.2	1.5-3.0	1.7	0.6-4.0
90-Day mortality	4.1	3.1-5.2	3.8	1.9-6.8

Post-operative complications

Inpatient Post-operative complications

Complication rates were only reported for English patients, as this data was not recorded in the Cancer Network Information System Cymru (CaNISC) for Welsh patients.

Overall about a third of all oesophagectomies and a fifth of all gastrectomies suffered a post-operative complication. Further analysis of specific complication rates are shown in Table 6-4 and Table 6-5, and compared to rates reported in the 2010 report[6]. Overall patients having a gastrectomy had lower complication rates for all specific complications than those undergoing an oesophagectomy.

The most common complication after an oesophagectomy was respiratory (including infection, pulmonary effusion, pulmonary embolism and acute respiratory distress syndrome), affecting 17.1 per cent of patients. For patients undergoing a gastrectomy the most common complication was unplanned return to theatre, affecting 8.1 per cent of cases.

Comparing complication rates to those reported in the 2010 NOGCA report reveals relatively unchanged rates[6]. There has been a statistically significant increase in the proportion of patients suffering a respiratory or cardiac complication after oesophagectomy. This may reflect improved reporting of complications over this time frame.

Table 6-4
Unadjusted rates of inpatient complications after curative oesophagectomy, in England

Complication	2009/10 Overall (n=2,200)		2011/13 Overall (n=2,960)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
Any Complication	29.8	27.9-31.8	33.0	31.3-34.7
Anastomotic Leak	8.3	7.2-9.6	7.1	6.2-8.0
Chyle Leak	3.1	2.4-4.0	3.2	2.6-3.9
Cardiac	5.2	4.3-6.2	7.3	6.3-8.2
Wound Infection	3.9	3.1-4.8	3.3	2.6-3.9
Respiratory	12.9	11.5-14.4	17.1	15.8-18.5
Re-Operation	10.2	8.9-11.6	9.8	8.6-10.9

Table 6-5
Unadjusted rates of inpatient complications after curative gastrectomy, in England

Complication	2009/10 Overall (n=1,412)		2011/13 Overall (n=1,786)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
Any Complication	19.4	17.4-21.6	19.0	17.2-20.9
Anastomotic Leak	5.9	4.7-7.2	4.8	3.9-5.9
Chyle Leak	0.4	0.1-0.8	0.4	0.2-0.9
Cardiac	3.8	2.9-5.0	2.4	1.7-3.2
Wound Infection	3.3	2.4-4.3	2.4	1.7-3.2
Respiratory	7.3	6.0-8.8	7.8	6.6-9.1
Re-Operation	7.4	6.0-8.9	8.1	6.8-9.6

Variations in complication rates according to surgical approach

Given the increasing trend towards using minimally invasive surgical approaches, it is important to consider the risk of complications associated with these approaches in further detail. Further analysis is presented in Table 6-6 and Table 6-7.

Patients undergoing MI oesophagectomies appeared to have a statistically higher rate of anastomotic leaks compared to patients undergoing open oesophagectomies (11.7 per cent (95.0 per cent CI 8.6-15.4) vs 6.7 per cent (95.0 per cent CI 5.5-8.0)). Similarly, there was an increased need for re-operation in patients undergoing MI oesophagectomies compared to open, although this difference was not statistically significant, 13.5 per cent (95.0 per cent CI 10.0-17.6) vs 8.7 per cent (95.0 per cent CI 7.3-10.3). For gastrectomies, there did not appear to be any significant differences in complication rates according to surgical approach.

Table 6-6
Unadjusted rates of inpatient complications after curative oesophagectomy, by surgical approach, in England

Complication	Open (n=1,584)		Hybrid (n=749)		Minimally Invasive (n=369)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
Any Complication	34.5	32.2-36.9	36.3	32.9-39.9	33.9	29.0-39.0
Anastomotic Leak	6.7	5.5-8.0	7.1	5.3-9.1	11.7	8.6-15.4
Chyle Leak	3.1	2.3-4.1	3.7	2.5-5.4	4.7	2.5-5.4
Cardiac	8.6	7.3-10.1	7.9	6.1-10.0	5.1	3.1-7.9
Wound	3.9	3.0-5.0	3.6	2.4-5.2	1.9	0.8-3.9
Respiratory	18.1	16.2-20.0	20.1	17.2-23.1	14.1	10.7-18.1
Re-Operation	8.7	7.3-10.3	10.9	8.7-13.5	13.5	10.0-17.6

Table 6-7
Unadjusted rates of inpatient complications after curative gastrectomy, by surgical approach, in England

Complication	Open (n=1,466)		Minimally Invasive (n=278)	
	Rate (%)	95% CI (%)	Rate (%)	95% CI (%)
Any Complication	19.6	17.6-21.8	16.5	12.4-21.4
Anastomotic Leak	5.2	4.1-6.4	3.6	1.7-6.5
Chyle Leak	0.5	0.2-1.0	0.4	0.0-2.0
Cardiac	2.5	1.7-3.4	2.5	1.0-5.1
Wound	2.5	1.8-3.5	2.2	0.8-4.6
Respiratory	7.8	6.5-9.3	7.2	4.4-10.9
Re-Operation	7.7	6.3-9.3	10.6	7.0-15.1

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 in England and Wales (Table 6-8). Median length of stay was slightly shorter for patients who had had minimally invasive surgery.

Table 6-8
Length of stay (in days) after curative oesophagectomy or gastrectomy by approach, for England and Wales

	Median (IQR)
Oesophagectomy	**13 (10-20)**
Open	14 (10-20)
Hybrid	13 (10-18)
MI	12 (9-20)
Gastrectomy	**11 (8-15)**
Open	11 (9-15)
MI	9 (7-15)

Efficacy of Surgery

Lymph node dissection

Adequate lymph node dissection is required for the Union of International Cancer Control (UICC) staging of O-G cancer, and it is also important because inadequate lymphadenectomy may compromise the chance of surgery being curative. The extent of the lymph node dissection was examined for patients in England and Wales. Where intended extent of nodal dissection was recorded this was a 2-field dissection for 83.0 per cent of oesophagectomies and D2 resection for 75.0 per cent of gastrectomies. The proportion of D2 resections (a more radical form of resection) has increased significantly since the 2010 NOGCA Report, when only 52.0 per cent were[6].

The lymph node yield for oesophagectomies and gastrectomies are shown in Table 6-9. Overall 98.4 per cent of oesophagectomies yielded at least 6 lymph nodes, up from 96.0 per cent in the first audit. While for gastric cancer a minimum of 15 nodes were resected in 77.4 per cent of gastrectomies (up from 74.3 per cent in the first audit)[6].

Table 6-9
Nodal yield for curative resections, for England and Wales

	Number of nodes examined			
Oesophagectomy				
	1-5	**6-14**	**15 or more**	**Total**
n (%)	43 (1.6)	426 (15.8)	2,226 (82.6)	2,695
Gastrectomy				
	1-14	**15-24**	**25 or more**	**Total**
n (%)	356 (22.6)	531 (33.7)	688 (43.7)	1,575

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 resection margin, this was examined for all patients undergoing a curative resection in England and Wales. 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. But 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.

Since the 2010 Audit report the proportion of patients who had had an oesophagectomy who had positive longitudinal resection margin has fallen significantly from 6.4 per cent (95.0 per cent CI 5.3-7.6) to 3.7 per cent (95.0 per cent CI 3.0-4.4)[6], suggesting an improvement in the quality of surgery. Otherwise the results remain relatively unchanged over time (Table 6-10).

Table 6-10
Percentage of patients with positive resection margins after a curative resection, in England and Wales

	Oesophagectomy		Gastrectomy		Total	
	n	Overall %	n	Overall %	n	Overall %
Positive longitudinal (proximal or distal) resection margin	98	3.7	144	9.1	242	5.7
Positive circumferential margin	685	27.7	113	10.5	798	22.5

Key findings on surgical outcomes

Since the 2009/10 NOGCA report the following changes have been seen:

Decrease in 30 and 90 day mortality.

Proportion of patients suffering any complication after a curative resection is unchanged.

Increase in proportion of patients who had adequate number of lymph nodes resected for UICC staging, up from 96.0 per cent to 98.4 per cent for oesophagectomies and from 75.0 per cent to 77.2 per cent for gastrectomies.

Statistically significant reduction in proportion of patients who had positive longitudinal resection margins after oesophagectomy, from 6.4 per cent to 3.7 per cent. But there was no change for gastrectomies.

7. Use of definitive oncology and outcomes

Studies have demonstrated that definitive chemoradiotherapy may be curative in patients with oesophageal squamous cell cancers[7]. As a result, the most recent guidelines for the management of oesophago-gastric (O-G) cancers recommend that definitive chemoradiotherapy is used for proximal oesophageal squamous cell cancers (SCC), and that for SCC tumours affecting the middle/lower oesophagus either chemoradiotherapy alone or in combination with surgery should be considered[7].

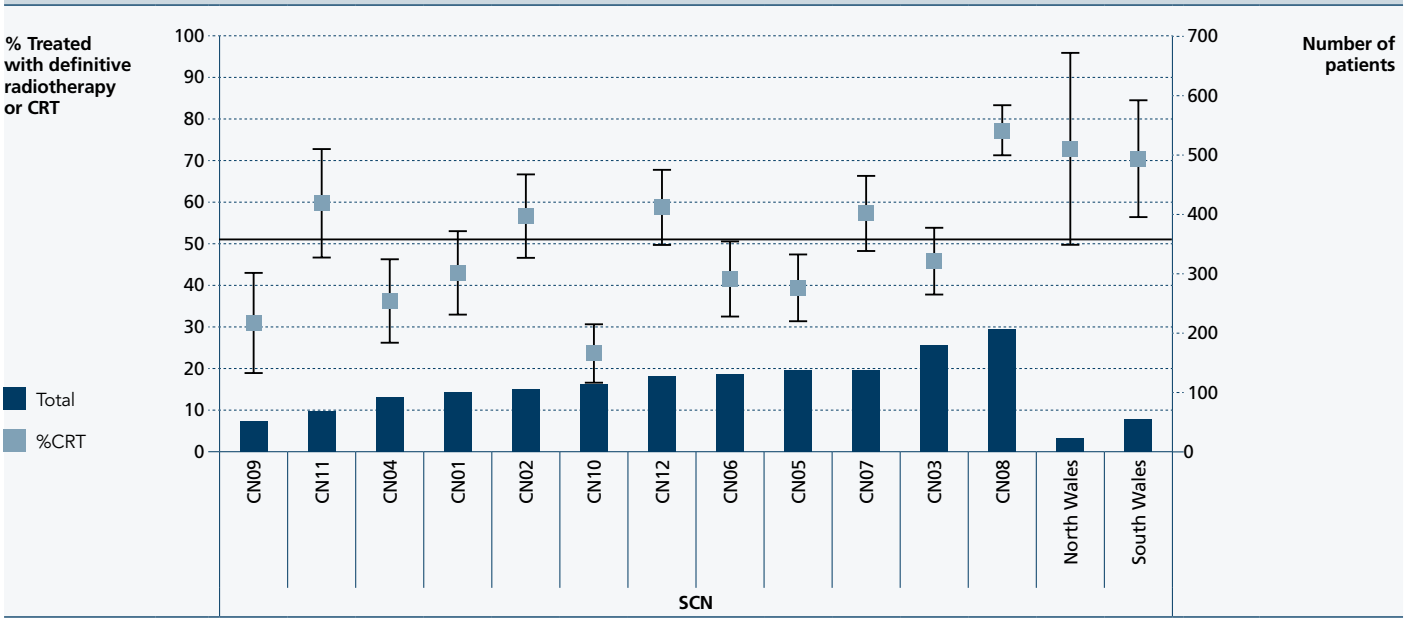
Within the audit dataset, use of curative oncology as the planned treatment modality can be coded under two separate planned modalities, planned curative radiotherapy or definitive chemoradiotherapy. For the purposes of this chapter we consider use of both these modalities in England and Wales.

Variation in use of definitive oncology across SCNs

Choice of treatment for oesophageal SCC

Given that oesophageal squamous cell cancers (SCC) can be managed curatively with either surgery or definitive oncology, we went on to examine choice of treatment across Strategic Clinical Networks (SCNs) (Figure 7-1). This appeared to vary significantly across SCNs, and should be investigated further at a local level. It is particularly important to ensure that cases where the disease is non-metastatic but the patient is not considered fit for surgery, that the case is discussed with an oncologist with a view to curative oncological treatment.

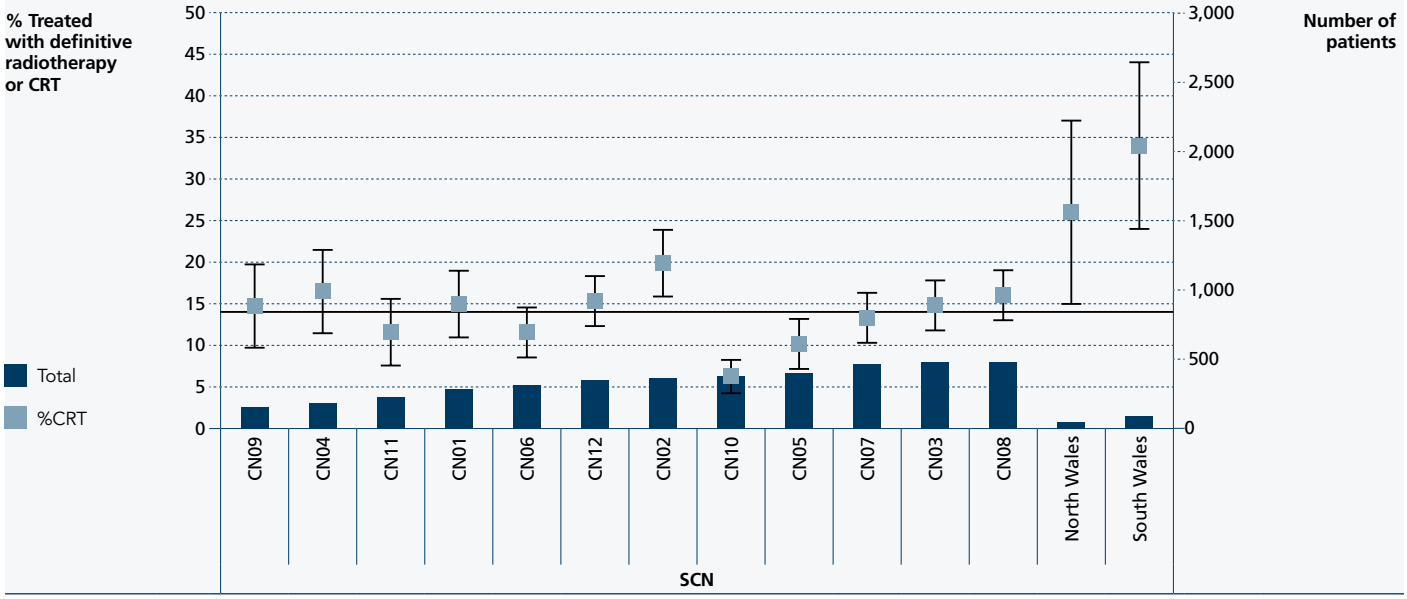
Figure 7-1
Proportion of patients with oesophageal SCC managed with curative intent, treated with definitive radiotherapy or chemoradiotherapy (CRT) vs surgery, in England and Wales.



Choice of treatment for oesophageal adenocarcinomas

Evidence to support the use of definitive chemoradiotherapy is less strong for oesophageal adenocarcinomas and is restricted to studies of chemoradiotherapy in patients who are unsuitable for surgery[8]. Figure 7-2 sets to investigate variations in the use of definitive oncology in the treatment of oesophageal adenocarcinomas across SCNs, this again appeared to vary significantly.

Figure 7-2
Proportion of patients with oesophageal adenocarcinoma managed with curative intent, treated with definitive radiotherapy or CRT vs surgery, in England and Wales.



Choice of definitive oncology

Using the National Oesophago-Gastric Cancer Audit (NOGCA) dataset alone, we demonstrated that the majority of patients who were planned to receive definitive oncology received chemoradiotherapy, as compared to radiotherapy alone (Table 7-1). The median age of patients treated with definitive oncological treatment was 72 years (IQR 64-78), and 83.0 per cent had performance status of 0 or 1.

Table 7-1
Use of definitive oncological treatment by tumour site, for England and Wales

Treatment Intent	Oesoph SCC	Oesoph ACA Upper/Mid	Oesoph ACA Lower/SI	GOJ SII/SIII	Stomach	Total
Number of Patients	413	26	183	34	14	**670**
Radiotherapy %	25.0	50.0	43.0	38.0	43.0	**32.0**
Chemoradiotherapy %	75.0	50.0	57.0	62.0	57.0	**68.0**

Completion rates

Where patients received chemotherapy as part of their definitive oncological therapy, 69.7 per cent of patients completed their planned treatment. The most common reasons for failing to complete planned chemotherapy included acute chemotherapy toxicity (11.1 per cent) and disease progression (9.9 per cent). In contrast radiotherapy was much better tolerated with 96.0 per cent of patients completing their radiotherapy as planned.

RTDS Data linkage

Since 1 April 2009 all facilities in England providing radiotherapy services have been required to return data to the radiotherapy dataset (RTDS) on attendances for radiotherapy and treatment given. For the first time, we have been able to link the NOGCA dataset to this dataset. This linkage will enable us to assess the quality of data submitted to the audit for radiotherapy attendances, and also allow us to perform further analysis of dosing regimens used. In this chapter we will be focusing on the management of patients where treatment intent was curative.

At this stage we only had data available in the RTDS dataset for the 2011-12 audit year. **In England 2,516 (90.6 per cent) of the RTDS record were successfully linked** to a record in the NOGCA dataset. Further details of the data linkage process are reported in the Annex.

Radiotherapy dose and regime

The Royal College of Radiologists (RCR) recommendations[9] on the use of definitive radiotherapy in O-G cancer acknowledged that the evidence base for dose-fractionation for O-G cancer is limited, but they do make some recommendations (Table 7-1).

Overall 380 (15.1 per cent) of the RTDS records were for curative radiotherapy, either alone or in combination with chemotherapy. Of these 378 were for oesophageal cancer and only two were for gastric cancer, this was to be expected given the lack of evidence for use of radiotherapy as a definitive treatment for gastric cancer.

Use of definitive chemoradiotherapy for oesophageal cancer

Definitive chemoradiotherapy (CRT) was planned for 224 patients with oesophageal cancer in England, using RTDS we could identify the dosing regimen given for 159 (71.0 per cent) of these.

In 59.7 per cent of cases the radiotherapy treatment regimen followed one of those recommended by the RCR. The most commonly used regimen was 50Gy over 25 attendances.

Figure 7-3
RCR recommendations on use of radiotherapy in O-G cancer

RCR Recommended dosing regimens

Oesophageal cancer

- Definitive chemoradiotherapy: Recommended radiotherapy dose of 50.4Gy in 28 daily fractions or 50Gy in 25 daily fractions.
- Definitive radiotherapy: Recommended radiotherapy dose of 50Gy in 15 or 16 daily fractions, or 50-55 Gy in 20 daily fractions or 60Gy in 30 daily fractions.

Gastric cancer

- Not a recommended treatment.

Table 7-2
Radiotherapy dose and fractions used for curative radiotherapy when combined with chemotherapy for oesophageal cancer, in England

	Doses	Fractions	Number (%)
Evidence Based Doses	50.4 Gy	28	7 (4.4)
	50 Gy	25	88 (55.3)
Other regimens used in >=5 patients	54 Gy	30	21 (13.2)
	50 Gy	24	12 (7.5)

Use of curative radiotherapy for oesophageal cancer

Overall 83 patients were planned to receive definitive radiotherapy for oesophageal cancer in England. The dose of radiotherapy given and total number of attendances was known for 56 (71.0 per cent) of these.

In 46.4 per cent of cases the treatment regimen followed RCR recommendations for use of definitive radiotherapy in oesophageal cancer (Table 7-3). The most commonly used regimen was 55Gy over 20 fractions. For 17.9 per cent of patients a regime of 40Gy/15 was used, this is normally used for radiotherapy with palliative intent, but oncology intent and planned treatment modality were both recorded as curative in the audit dataset.

Table 7-3
Radiotherapy dose and fractions used for curative radiotherapy of oesophageal cancer, in England

	Doses	Fractions	Number (%)
Evidence Based Doses	50 Gy	15 or 16	<5
	50-55 Gy	20	22 (39.3)
	60 Gy	30	<5
Other regimens used in >=5 patients	40 Gy	15	10 (17.9)

Key findings on definitive oncology

Significant variation in use of definitive oncology as curative treatment option for oesophageal cancers SCCs and adenocarcinomas across SCNs.

Definitive oncological treatment is normally a combination of chemoradiotherapy.

Over two-thirds of patients completed their planned treatment, with the majority of the toxicity relating to use of chemotherapy. Over 95.0 per cent of patients completed their radiotherapy as planned.

NOGCA-RTDS data linkage:

Achieved for the first time and demonstrated high levels of case-ascertainment of the NOGCA.

Demonstrated variation in use of dose-fractionation that requires further investigation, as to whether this represents true variation in usage and lack of adhearance to published guidelines or data quality issues.

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

This is the first time that the National Oesophago-gastric Cancer Audit has linked a comprehensive national treatment dataset with the detailed audit dataset containing detailed associated treatments and outcomes at a patient level. This will provide a powerful tool to explore both how radiotherapy is being used in the UK compared with evidence based best practice and in the future the outcomes from such treatment used in routine clinical practice.

As usual with the first iteration of such data linkage we need to explore what the information is telling us, and confirm whether the findings relate a true reflection of variation in practice or whether they are confounded by issues regarding data quality. Of note is that RTDS will collect treatment given rather than planned which explains a long tail of various dose/fractionation schedules.

Chemoradiotherapy is more effective in the treatment of patients with SCC oesophagus and patients with ACA oesophagus not suitable for surgery, than radiotherapy alone. This is seen in both the numbers of treatment and consistency of treatment regimen. There is awareness that the dose of such regimen may be low and this will be the subject of a prospective UK trial but it is interesting to see some centres already using 54Gy in 30 fractions ahead of such a trial. The small numbers of patients being treated with radiotherapy alone makes interpretation more difficult but challenges the clinical oncology community to better define where this treatment sits in treatment algorithms.

8. Oesophago-gastric cancer in the elderly

Management of oesophago-gastric (O-G) cancer in the elderly is important, as 58.5 per cent of patients with O-G cancer are aged 70 or over. A recent report published by the Royal College of Surgeons raised concern that there is still age discrimination in the NHS, and this may be preventing older people having access to lifesaving surgery[10]. We therefore sort to investigate the impact of a patient's age on diagnosis and management of O-G cancer, in England and Wales.

Route to diagnosis

The audit considers three distinct routes to diagnosis: referrals from a general practitioner (GP) which were subclassified 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.

Overall about 14.0 per cent of O-G cancers were diagnosed following an emergency admission, this is concerning because this group of patients were significantly less likely to be considered for curative therapy. We therefore set out to investigate whether patient referral patterns were associated with age at diagnosis.

Table 8-1 investigates how route to referral varies according to age at diagnosis. There was a dramatic increase in the proportion of patients referred as an Emergency in patients over the age of 80 at diagnosis (21.2 per cent vs 11.4 per cent, p<0.001). It was particularly concerning to note that almost a third of gastric cancers diagnosed in patients over 80 were as a result of an emergency admission. Where patients over 80 were referred by their GP they were significantly more likely to have been referred as a 'two week wait' referral for suspected cancer (73.8 per cent vs 71.0 per cent, p=0.01).

Table 8-1
Source of referral among O-G cancer patients, in England and Wales, stratified by age at diagnosis

	Oesophageal or GOJ tumour			Gastric tumour			Overall
Age (years)	<70	70-79	≥80	<70	70-79	≥80	
Emergency %	8.0	9.0	16.0	20.0	20.0	31.0	14.0
GP referral %	71.0	71.0	68.0	56.0	58.0	49.0	66.0
Other hospital referral %	21.0	20.0	16.0	24.0	22.0	20.0	20.0
Total	**6,785**	**4,638**	**3,665**	**1,882**	**2,107**	**1,980**	**21,057**
Missing	574	347	254	210	182	161	1,728

1,728 observations are reported as missing since source of referral was previously not a mandatory item and the current option 'not known' is considered here as missing data

Age at diagnosis was not known for 48 patients

Patient characteristics

As expected the proportion of gastric cancers versus oesophageal cancers increased with age (from 22.0 per cent of O-G cancers in patients under 70, to 35.0 per cent of O-G cancers in patients aged 80 or above) (Table 8-2). Within the oesophagus the proportion of cancers affecting the mid/upper oesophagus increased with age.

It was also noted that the proportion of oesophageal squamous cell cancers (SCC) increased with age, from 27.0 per cent in patients under 70 to 32.0 per cent in patients over 80.

There was a significant increase in the proportion of patients with performance status >=3 and one or more co-morbidities as the age of the patient increased. Stage at diagnosis did not vary significantly according to age of patient at diagnosis.

Table 8-2
Patient characteristics by age (years), for England and Wales

	<70	70-79	≥80	Overall
O-G cancer site (%)				
Oesophagus	7,359 (78.0)	4,985 (69.0)	3,919 (65.0)	16,263 (71.0)
• SCC %	27.0	28.0	32.0	29.0
• Upper/mid ACA %	8.0	8.0	11.0	9.0
• Lower/SI %	48.0	44.0	41.0	45.0
• GOJ SII/III %	18.0	19.0	16.0	17.0
Stomach	2,092 (22.0)	2,289 (31.0)	2,141 (35.0)	6,522 (29.0)
Performance status ≥3 (%)	578 (7.0)	837 (14.0)	1,385 (29.0)	2,800 (15.0)
Patient with ≥1 co-morbidity (%)	2,809 (30.0)	2,808 (39.0)	2,315 (38.0)	7,932 (35.0)
Stage 0/1 at diagnosis (%)	358 (5.0)	289 (6.0)	189 (5.0)	836 (5.0)

* Age at diagnosis not known for 48 patients

Treatment plan

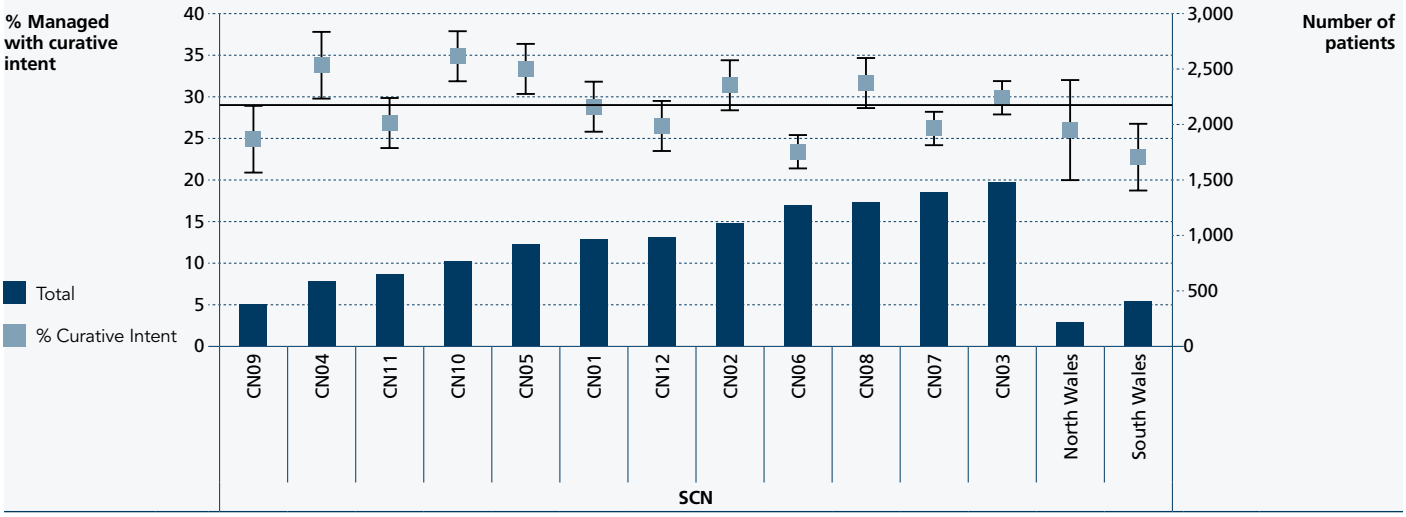
After adjusting for known confounders (sex, TNM stage at diagnosis, performance status, comorbidities and ASA grade) there was no significant difference in the proportion of patients managed with curative intent (Table 8-3).

Across Strategic Clinical Networks (SCNs) there was significant variation in the proportion of patients aged 70 or over who were managed with curative intent (Figure 8-1).

Table 8-3
Treatment intent by age (years), in England and Wales

	% Managed curatively	Unadjusted odds ratio	Adjusted odds ratio	95% CI
Oesophagus				
<70	51.0	1	1	
70-79	43.0	0.72	1.12	0.61-2.09
≥80	11.0	0.12	0.40	0.15-1.08
Stomach				
<70	44.0	1	1	
70-79	39.0	0.80	1.46	0.87-2.45
≥80	17.0	0.25	0.72	0.39-1.32

Figure 8-1
Proportion of patients aged 70 or over managed with curative intent, in England and Wales.



Where the treatment intent was curative we went on to investigate the planned treatment modality (Table 8-4). This demonstrated that planned choice of curative treatment varied significantly with age.

Overall there was a trend towards choosing less invasive curative treatment modalities in older patients. For instance, older patients were more likely to have surgery alone, without use of combined oncological therapy. While for oesophageal SCC, use of curative radiotherapy was markedly higher in patients over 80, and there was a corresponding reduction in use of surgery either alone or in combination with other oncological therapy.

Table 8-4
Choice of curative treatment, by age of patient and type of cancer, for England and Wales

Curative treatment	Oesophageal SCC			Oesophageal ACA			Gastric		
	<70	70-79	≥80	<70	70-79	≥80	<70	70-79	≥80
Surgery %	12.0	14.0	15.0	19.0	27.0	47.0	31.0	56.0	84.0
Surgery and chemo/CRT %	43.0	34.0	10.0	70.0	54.0	15.0	62.0	39.0	8.0
Radiotherapy alone %	4.0	8.0	33.0	1.0	4.0	14.0	0.0	0.0	2.0
Definitive CRT %	38.0	40.0	37.0	5.0	8.0	14.0	2.0	1.0	2.0
EMR %	3.0	4.0	4.0	5.0	7.0	12.0	4.0	4.0	5.0
Total	**746**	**480**	**118**	**2,424**	**1,329**	**256**	**813**	**787**	**327**
Missing	91	46	15	240	138	20	58	48	10

Length of stay

Median length of stay appeared to increase slightly with age (Table 8-5).

Table 8-5
Length of stay (in days) after curative oesophagectomy or gastrectomy by age, for England and Wales

	Median (IQR)
Oesophagectomy	**13 (10-20)**
<70	13 (10-19)
70-79	14 (11-22)
80+	14 (11-27)
Gastrectomy	**11 (8-15)**
<70	10 (8-14)
70-79	11 (9-15)
80+	11.5 (8-18)

Key findings on O-G cancer in the elderly

Higher proportion of elderly patients diagnosed as result of emergency admission.

Elderly patients are not less likely to be considered for curative treatments after adjusting for known confounders.

Across SCNs there was significant variation in the proportion of patients aged 70 or over managed with curative intent, this should be investigated at a local level.

Elderly patients managed with curative intent generally managed with least invasive curative treatment option.

9. Early cancers

Overall survival for oesophago-gastric (O-G) cancers remains poor, with only one in seven patients surviving five years[11, 12]. Key to improving survival is increasing the proportion of cancers diagnosed at an early stage, ideally before there is invasion of the submucosa when the risk of lymphatic spread is minimal[13, 14]. In this situation, five year survival may reach about 90.0 per cent[15].

Until recently oesophagectomy has been the standard treatment for early oesophageal cancers, but over recent years the development of advanced endoscopic techniques such as endoscopic mucosal resection (EMR) and ablation has led to a shift in the guidelines towards recommending endoscopic treatment as first line treatment for patients with early cancers.

Patient characteristics

Full staging information was available for 15,638 patients (68.5 per cent), of these **5.4 per cent (n=837) were diagnosed at an early stage** T0/1, N0 and M0, in England and Wales.

Overall, there was no difference in the average age of patients and the proportion of each sex in patients diagnosed with early versus late cancers (Table 9-1). But patients diagnosed with early cancers were significantly less likely to have no co-morbidities (p=0.001 for oesophageal cancer and p=0.032 for gastric cancer).

Table 9-1
Summary of patient characteristics by stage at diagnosis, for England and Wales.

	Oesophageal / GOJ		Gastric	
	Early	Late	Early	Late
Median Age (IQR)	70 (63-78)	70 (62-78)	75 (66-81)	74 (66-81)
Men (%)	72.2	71.8	62.2	65.6
Performance status 0/1 (%)	73.7	71.1	64.5	61.8
No co-morbidity (%)	**56.5**	**63.5**	**55.0**	**61.8**

The proportion of cancers diagnosed at early stage also varied by site of cancer (Table 9-2), with lower oesophageal and junctional tumours more likely to be diagnosed at an early stage. Furthermore squamous cell cancers were less likely than adenocarcinomas to be diagnosed at an early stage (3.8 per cent (95.0 per cent CI 3.1-4.6) vs 5.7 per cent (95.0 per cent CI 5.3-6.2)).

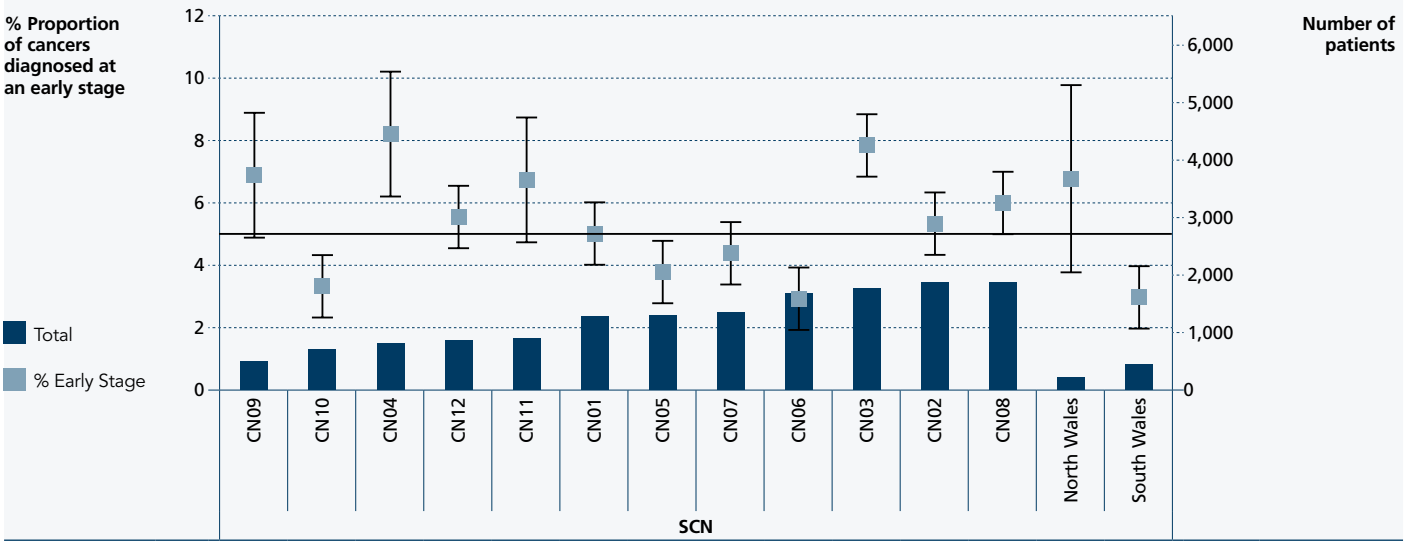
Table 9-2
Proportion of cancers diagnosed at early stage by O-G group, for England and Wales

Stage at Diagnosis	Oesophageal SCC	Oesophageal ACA Upper/Mid	Oesophageal ACA Lower/SI	GOJ SII/SIII	Stomach	Total
Early, %	3.9	4.8	6.5	3.5	6.1	**5.4**
Number of patients	3,211	899	5,273	2,134	4,120	**15,637**

The proportion of cancers diagnosed early was also significantly higher among patients referred by another hospital consultant (11.1 per cent), compared to those referred by their GP (3.6 per cent) or an Emergency (4.5 per cent) (p<0.001). This pattern would be consistent with a proportion of these patients diagnosed at an early stage coming from surveillance endoscopies.

Across Strategic Clinical Networks (SCNs) there was significant variation in the proportion of cancers diagnosed at an early stage (Figure 9-1).

Figure 9-1
Proportion of all O-G cancers diagnosed at an early stage, in England and Wales.



Treatment plan

Of all patients managed with a curative intent 9.4 per cent had been diagnosed at an early stage. But **74.7 per cent of patients who had their cancer diagnosed at an early stage were managed with curative intent**. This increased to 89.0 per cent patients who were under 80 years with performance status 0/1 and ≤1 co-morbidity.

For both oesophageal and gastric cancers surgery was the most frequently chosen treatment modality. But EMR was also frequently used, in 26.6 per cent of early oesophageal cancers and 11.7 per cent of early gastric cancers.

Table 9-3
Planned curative treatment modality for early cancers, for England and Wales

	Oesophagus/GOJ	Stomach
Surgery %	50.0	71.0
Chemotherapy and surgery %	7.6	16.2
Chemoradiotherapy and surgery %	1.6	0.0
EMR %	26.6	11.7
Radiotherapy only %	6.0	1.1
Definitive chemoradiotherapy %	**8.3**	**0.0**
Total	**436**	**179**
Missing	150	72

Use of Surgery vs EMR for early cancers

Overall choice of curative treatment for early cancers was not significantly associated with patient characteristics including age, sex, performance status and presence of co-morbidities. Although there did appear to be a trend towards use of EMR in preference to surgery for patients with a worse performance status and one or more co-morbidities.

Where the degree of mucosal invasion was known, we found that 34.1 per cent of patients with only mucosal invasion had EMR as their planned curative modality, compared to only 18.0 per cent of patients where there was known sub-mucosal invasion (p=0.074). This reflects the fact that the risk of lymphatic spread is minimal where patients have only mucosal invasion but once the sub-mucosa is involved this risk increases to 20.0 per cent.

Table 9-4
Patient characteristics by choice of curative treatment, for England and Wales

	Any Surgery n=414	EMR n=137
Median Age (IQR)	69 (61-76)	71 (65-77)
Men (%)	72.0	75.9
Performance status 0/1 (%)	82.6	79.0
No co-morbidity (%)	53.6	58.4

Key findings on O-G cancer in the elderly

One in 20 O-G cancers diagnosed at an early stage, with lower oeophageal/GOJ tumours more likely to be diagnosed early.

Across SCNs there was significant variation in the proportion of cancers diagnosed at an early stage, this should be investigated at a local level.

Three quarters of patients who have their cancer diagnosed early are managed with curative intent.

Where patients are managed curatively, the most common modality is surgical although a quarter of early oesophageal tumours are now managed by EMR alone.

10. Conclusions and recommendations

This 2014 Annual Report provides a comprehensive picture on the management and outcomes of curative therapy for patients diagnosed with oesophago-gastric (O-G) cancer. We commend all NHS organisations for their effort to support the audit.

A key achievement has been to achieve the excellent case-ascertainment for surgical resections, due to the tremendous support of all professional bodies, and in particular, the surgical teams.

At the same time more attention needs to be paid to ensure that all patients, irrespective of treatment plan, are duly entered into the audit. Only by maintaining the whole case-ascertainment rates will the audit be able to produce the highest quality output that clinicians, managers, commissioners and patients expect to support their decision-making.

The results of this report should be read in conjunction with the 2014 Progress Report, which focused on the palliative treatment pathway. Together, both reports portray a picture of an ever-improving service for O-G cancer patients. Worth highlighting are the improved outcomes after surgery, the increased use of non-surgical curative therapy and the indications that patients are being considered for surgery, irrespective of age.

Yet, challenges remain. While mortality rates and other quality indicators of surgery, such as positive resection margins, have decreased, complication rates remain high. How these can be reduced further needs to be addressed. Moreover, a recurrent theme in improving outcomes is the improved early detection of cancers. For various reasons, some related to the insidious symptoms associated with O-G cancer, too few patients are diagnosed at an early stage. Improving early detection is a key challenge in improving outcomes for O-G cancer.

The audit highlighted a few key areas where Strategic Clinical Networks (SCNs) and NHS organisations should investigate their results further. These include the following:

1. Cases ascertainment for surgical cases is excellent, but the overall case ascertainment has fallen. Trusts need to tighten up local protocols to ensure these patients are submitted to the audit.

2. As surgical mortality continues to fall, increased focus should go into monitoring other indicators of the quality of surgery and post-operative care, such as lymph node yield, resection margin status, complication rate and length of stay. These outcomes should be monitored prospectively at a Trust level.

3. Oncologists need to investigate further reasons behind the variation in dosing regimens used for definitive chemoradiotherapy and lack of adherence to published guidelines.

4. Networks should focus on increasing the proportion of patients diagnosed at an early stage, as these patients are significantly more likely to be managed with curative intent. Where patients are diagnosed early, Trusts should consider referral to centres with endoscopic expertise in removal of such lesions.

Annex 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 and Ireland
Martin Richardson	Consultant Surgeon	Cancer Networks
Jane Ingham	CEO	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
Dr Antony Ingold	Trustee	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 Dietician	British Dietetic Association Oncology Group
Greg Rubin	Professor General Practice and Primary Care	Durham University

Members of Project Board	
Dr Stuart Riley	British Society of Gastroenterologist (BSG)
Professor Mike Griffin	Association of Upper Gastrointestinal Surgeons of Great Britain & Ireland
Ms Alyson Whitmarsh	Health and Social Care Information Centre
Ms Jane Ingham	Healthcare Quality Improvement Partnership (HQIP)
Professor Jan van der Meulen (chair)	London School of Hygiene and Tropical Medicine
Dr Diana Tait	Royal College Radiologists (RCR)
Mr Richard Hardwick	Association of Upper GI Surgeons (AUGIS)

Annex 2: List of Strategic Clinical Networks in England and Welsh Units

SCN Code	SCN Name	NHS Trust code	Trusts in the SCN
CN01	Northern England	RNL	North Cumbria University Hospitals NHS Trust
		RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
		RR7	Gateshead Health NHS Foundation Trust
		RTR	South Tees Hospitals NHS Foundation Trust
		RTF	Northumbria Healthcare NHS Foundation Trust
		RLN	City Hospitals Sunderland NHS Foundation Trust
		RE9	South Tyneside NHS Foundation Trust
		RXP	County Durham and Darlington NHS Foundation Trust
		RVW	North Tees And Hartlepool NHS Foundation Trust
CN02	Greater Manchester, Lancashire and South Cumbria	RMP	Tameside Hospital NHS Foundation Trust
		RXN	Lancashire Teaching Hospitals NHS Foundation Trust
		RWJ	Stockport NHS Foundation Trust
		RW6	Pennine Acute Hospitals NHS Trust
		RM4	Trafford Healthcare NHS Trust
		RTX	University Hospitals of Morecambe Bay NHS Trust
		RXR	East Lancashire Hospitals NHS Trust
		RM2	University Hospital of South Manchester NHS Foundation Trust
		RM3	Salford Royal Hospitals NHS Foundation Trust
		RMC	Bolton Hospitals NHS Foundation Trust
		RXL	Blackpool Teaching Hospitals NHS Foundation Trust
		RW3	Central Manchester University Hospitals NHS Foundation Trust
		RBT	The Mid Cheshire Hospitals NHS Trust
		RRF	Wrightington, Wigan and Leigh NHS Foundation Trust
		RBV	The Christie Hospital NHS Foundation Trust
		RJN	East Cheshire NHS Trust
CN03	Yorkshire and the Humber	RWY	Calderdale And Huddersfield NHS Foundation Trust
		RCB	York Teaching Hospital NHS Foundation Trust
		RR8	Leeds Teaching Hospitals NHS Trust
		RWA	Hull and East Yorkshire Hospitals NHS Trust
		RCF	Airedale NHS Trust
		RJL	Northern Lincolnshire and Goole Hospitals NHS Foundation Trust
		RAE	Bradford Teaching Hospitals NHS Foundation Trust
		RCD	Harrogate and District NHS Foundation Trust
		RFF	Barnsley Hospital NHS Foundation Trust
		RXF	Mid Yorkshire Hospitals NHS Trust
		RCC	Scarborough and North East Yorkshire Health Care NHS Trust
		RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust
		RFS	Chesterfield Royal Hospital NHS Foundation Trust
		RFR	The Rotherham NHS Foundation Trust
		RHQ	Sheffield Teaching Hospitals NHS Foundation Trust
CN04	Cheshire and Merseyside	RJR	Countess of Chester Hospital NHS Foundation Trust
		RWW	Warrington and Halton Hospitals NHS Foundation Trust (WAS North Cheshire Hospitals NHS Trust)
		RBN	St Helens and Knowsley Hospitals NHS Trust
		RVY	Southport and Ormskirk Hospital NHS Trust
		RQ6	Royal Liverpool and Broadgreen University Hospitals NHS Trust
		RBL	Wirral University Teaching Hospital NHS Foundation Trust
		REM	Aintree University Hospital NHS Foundation Trust
		REN	The Clatterbridge Centre NHS Foundation Trust
		RBQ	Liverpool Heart and Chest NHS Foundation Trust

SCN Code	SCN Name		Trusts in the SCN
CN05	East Midlands	RWD	United Lincolnshire Hospitals NHS Trust
		RNS	Northampton General Hospital NHS Trust
		RK5	Sherwood Forest Hospitals NHS Foundation Trust
		RTG	Derby Hospitals NHS Foundation Trust
		RNQ	Kettering General Hospital NHS Foundation Trust
		RX1	Nottingham University Hospitals NHS Trust
		RWE	University Hospitals of Leicester NHS Trust
		RJF	Burton Hospitals NHS Foundation Trust
CN06	West Midlands	RBK	Walsall Healthcare NHS Trust
		RJC	South Warwickshire NHS Foundation Trust
		RNA	Dudley Group of Hospitals NHS Foundation Trust
		RKB	University Hospitals Coventry and Warwickshire NHS Trust
		RR1	Heart of England NHS Foundation Trust
		RL4	The Royal Wolverhampton Hospitals NHS Trust
		RLT	George Eliot Hospital NHS Trust
		RXW	The Shrewsbury and Telford Hospital NHS Trust
		RJD	Mid Staffordshire NHS Foundation Trust
		RJE	University Hospital of North Staffordshire NHS Trust
		RXK	Sandwell and West Birmingham Hospitals NHS Trust
		RWP	Worcestershire Acute Hospitals NHS Trust
		RLQ	Wye Valley NHS Trust
		RRK	University Hospital Birmingham NHS Foundation Trust
CN07	East of England	RC9	Luton and Dunstable University Hospital NHS Foundation Trust
		RWG	West Hertfordshire Hospitals NHS Trust
		RWH	East and North Hertfordshire NHS Trust
		RC1	Bedford Hospital NHS Trust
		RAJ	Southend University Hospital NHS Foundation Trust
		RDE	Colchester Hospital University NHS Foundation Trust
		RGP	James Paget University Hospitals NHS Foundation Trust
		RQ8	Mid Essex Hospital Services NHS Trust
		RDD	Basildon and Thurrock University Hospitals NHS Foundation Trust
		RGQ	Ipswich Hospital NHS Trust
		RM1	Norfolk and Norwich University Hospital NHS Foundation Trust
		RCX	The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust
		RGT	Cambridge University Hospitals NHS Foundation Trust
		RGN	Peterborough and Stamford Hospitals NHS Foundation Trust
		RQQ	Hinchingbrooke Health Care NHS Trust
		RGR	West Suffolk NHS Foundation Trust

SCN Code	SCN Name		Trusts in the SCN
CN08	London*	RPY	The Royal Marsden NHS Foundation Trust
		RAP	North Middlesex University Hospital NHS Trust
		RJ1	Guy's and St Thomas' NHS Foundation Trust
		RJ7	St George's Healthcare NHS Trust
		RC3	Ealing Hospital NHS Trust
		RVL	Barnet and Chase Farm Hospitals NHS Trust
		RQW	The Princess Alexandra Hospital NHS Trust
		RV8	North West London Hospitals NHS Trust
		RAL	Royal Free Hampstead NHS Trust
		RKE	The Whittington Hospital NHS Trust
		RJ2	Lewisham and Greenwich NHS Trust
		RYQ	South London Healthcare NHS Trust
		RAS	The Hillingdon Hospital NHS Trust
		RRV	University College London Hospitals NHS Foundation Trust
		RF4	Barking, Havering and Redbridge University Hospitals NHS Trust
		RQX	Homerton University Hospital NHS Foundation Trust
		RVR	Epsom And St Helier University Hospitals NHS Trust
		RQM	Chelsea and Westminster NHS Foundation Trust
		RAX	Kingston Hospital NHS Trust
		RFW	West Middlesex University Hospital NHS Trust
		RYJ	Imperial College Healthcare NHS Trust
		RJ6	Croydon Health Services NHS Trust
		R1H	Barts Health NHS Trust
		RJZ	King's College Hospital NHS Foundation Trust
		RGC	Whipps Cross University Hospital NHS Trust
CN09	Thames Valley	RD8	Milton Keynes Hospital NHS Foundation Trust
		RHW	Royal Berkshire NHS Foundation Trust
		RXQ	Buckinghamshire Healthcare NHS Trust
		RD7	Heatherwood and Wexham Park Hospitals NHS Foundation Trust
		RTH	Oxford University Hospitals NHS Trust
		RN3	Great Western Hospitals NHS Foundation Trust
CN10	South East Coast	RDU	Frimley Park Hospital NHS Foundation Trust
		RVV	East Kent Hospitals University NHS Foundation Trust
		RTK	Ashford and St Peter's Hospitals NHS Foundation Trust
		RWF	Maidstone and Tunbridge Wells NHS Trust
		RN7	Dartford and Gravesham NHS Trust
		RA2	Royal Surrey County Hospital NHS Foundation Trust
		RPA	Medway NHS Foundation Trust
		RXC	East Sussex Healthcare NHS Trust
		RTP	Surrey and Sussex Healthcare NHS Trust
		RYR16	Western Sussex Hospitals NHS Foundation Trust
		RYR18	Western Sussex Hospitals NHS Foundation Trust
		RXH	Brighton and Sussex University Hospitals NHS Trust
CN11	Wessex	RBD	Dorset County Hospitals NHS Foundation Trust
		RD3	Poole Hospital NHS Foundation Trust
		RN5	Hampshire Hospitals NHS Foundation Trust
		RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
		RN1	Winchester and Eastleigh Healthcare NHS Trust
		RNZ	Salisbury NHS Foundation Trust
		RHM	Southampton University Hospitals NHS Trust
		RHU	Portsmouth Hospitals NHS Trust
		R1F	Isle of Wight NHS Trust

SCN Code	SCN Name		Trusts in the SCN
CN12	South West	RA4	Yeovil District Hospital NHS Foundation Trust
		RD1	Royal United Hospital Bath NHS Trust
		RBZ	Northern Devon Healthcare NHS Trust
		RVJ	North Bristol NHS Trust
		RTE	Gloucestershire Hospitals NHS Foundation Trust
		RA3	Weston Area Health NHS Trust
		RA9	South Devon Healthcare NHS Foundation Trust
		RH8	Royal Devon and Exeter NHS Foundation Trust
		REF	Royal Cornwall Hospitals NHS Trust
		RBA	Taunton and Somerset NHS Foundation Trust
		RA7	University Hospitals Bristol NHS Foundation Trust
		RK9	Plymouth Hospitals NHS Trust
North Wales	North Wales	7A1	Betsi Cadwaladr University Local Health Board
South Wales	South Wales	7A2	Hywel Dda Local Health Board
		7A3	Abertawe Bro Morgannwg University Local Health Board
		7A4	Cardiff and Vale University Local Health Board
		7A5	Cwm Taf Local Health Board
		7A6	Aneurin Bevan Local Health Board

*In the future, reporting for SCN London will be split into two: London Cancer Strategic Clinical Network and London Cancer Alliance Strategic Clinical Network.

Annex 3: Levels of case-ascertainment for English NHS Trusts
(over 2011-13, 2 years of data)

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 receive care for O-G cancer in HES. Trusts submitting less than 10 cases in the 2 year period were excluded from the comparison.

Key
● Estimated case-ascertainment above 80%
■ Estimated case-ascertainment between 80-60%.
▲ Estimated case-ascertainment rates below 60%

SCN Code	SCN Name	NHS Trust code	NHS Trust name	Expected cases based on HES (grouped)	Tumour records submitted to the audit	% Case ascertainment rate (grouped)
CN01	Northern England Strategic Clinical Network	RNL	North Cumbria University Hospitals NHS Trust	101 to 150	127	80 to 90% ●
		RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust	251 to 300	341	> 90% ●
		RR7	Gateshead Health NHS Foundation Trust	51 to 100	81	> 90% ●
		RTR	South Tees Hospitals NHS Foundation Trust	201 to 250	283	> 90% ●
		RTF	Northumbria Healthcare NHS Foundation Trust	151 to 200	177	> 90% ●
		RLN	City Hospitals Sunderland NHS Foundation Trust	101 to 150	136	> 90% ●
		RE9	South Tyneside NHS Foundation Trust	51 to 100	85	> 90% ●
		RXP	County Durham and Darlington NHS Foundation Trust	151 to 200	223	> 90% ●
		RVW	North Tees And Hartlepool NHS Foundation Trust	101 to 150	164	> 90% ●
CN02	Greater Manchester, Lancashire and South Cumbria Strategic Clinical Network	RMP	Tameside Hospital NHS Foundation Trust	51 to 100	30	0 to 40% ▲
		RXN	Lancashire Teaching Hospitals NHS Foundation Trust	201 to 250	229	> 90% ●
		RWJ	Stockport NHS Foundation Trust	101 to 150	77	61 to 70% ■
		RW6	Pennine Acute Hospitals NHS Trust	251 to 300	230	71 to 80% ■
		RM4	Trafford Healthcare NHS Trust	<50	15	61 to 70% ■
		RTX	University Hospitals of Morecambe Bay NHS Trust	151 to 200	160	80 to 90% ●
		RXR	East Lancashire Hospitals NHS Trust	151 to 200	227	> 90% ●
		RM2	University Hospital of South Manchester NHS Foundation Trust	101 to 150	140	> 90% ●
		RM3	Salford Royal Hospitals NHS Foundation Trust	101 to 150	187	> 90% ●
		RMC	Bolton Hospitals NHS Foundation Trust	101 to 150	132	> 90% ●
		RXL	Blackpool Teaching Hospitals NHS Foundation Trust	101 to 150	175	> 90% ●
		RW3	Central Manchester University Hospitals NHS Foundation Trust	101 to 150	310	> 90% ●
		RBT	The Mid Cheshire Hospitals NHS Trust	101 to 150	110	> 90% ●
		RRF	Wrightington, Wigan and Leigh NHS Foundation Trust	101 to 150	115	> 90% ●
		RJN	East Cheshire NHS Trust	51 to 100	110	> 90% ●
CN03	Yorkshire and the Humber Strategic Clinical Network	RWY	Calderdale And Huddersfield NHS Foundation Trust	101 to 150	116	80 to 90% ●
		RCB	York Teaching Hospital NHS Foundation Trust	151 to 200	159	80 to 90% ●
		RR8	Leeds Teaching Hospitals NHS Trust	351 to 400	384	> 90% ●
		RWA	Hull and East Yorkshire Hospitals NHS Trust	201 to 250	264	> 90% ●
		RCF	Airedale NHS Trust	51 to 100	76	> 90% ●
		RJL	Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	151 to 200	202	> 90% ●
		RAE	Bradford Teaching Hospitals NHS Foundation Trust	151 to 200	192	> 90% ●
		RCD	Harrogate and District NHS Foundation Trust	51 to 100	76	> 90% ●
		RFF	Barnsley Hospital NHS Foundation Trust	51 to 100	100	> 90% ●
		RXF	Mid Yorkshire Hospitals NHS Trust	201 to 250	239	> 90% ●
		RCC	Scarborough and North East Yorkshire Health Care NHS Trust	<50	69	> 90% ●
		RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust	151 to 200	200	> 90% ●
		RFS	Chesterfield Royal Hospital NHS Foundation Trust	101 to 150	129	> 90% ●
		RFR	The Rotherham NHS Foundation Trust	101 to 150	105	> 90% ●
		RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	251 to 300	396	> 90% ●
CN04	Cheshire and Merseyside Strategic Clinical Network	RJR	Countess of Chester Hospital NHS Foundation Trust	101 to 150	75	61 to 70% ■
		RWW	Warrington and Halton Hospitals NHS Foundation Trust (WAS North Cheshire Hospitals NHS Trust)	101 to 150	93	71 to 80% ■
		RBN	St Helens and Knowsley Hospitals NHS Trust	101 to 150	141	> 90% ●
		RVY	Southport and Ormskirk Hospitals NHS Trust	101 to 150	103	> 90% ●
		RQ6	Royal Liverpool and Broadgreen University Hospitals NHS Trust	151 to 200	177	> 90% ●
		RBL	Wirral University Teaching Hospital NHS Foundation Trust	151 to 200	164	> 90% ●
		REM	Aintree University Hospital NHS Foundation Trust	151 to 200	210	> 90% ●

SCN Code	SCN Name	NHS Trust code	NHS Trust name	Expected cases based on HES (grouped)	Tumour records submitted to the audit	% Case ascertainment rate (grouped)
CN05	East Midlands Strategic Clinical Network	RWD	United Lincolnshire Hospitals NHS Trust	201 to 250	85	0 to 40% ▲
		RNS	Northampton General Hospital NHS Trust	101 to 150	121	80 to 90% ●
		RK5	Sherwood Forest Hospitals NHS Foundation Trust	101 to 150	115	80 to 90% ●
		RTG	Derby Hospitals NHS Foundation Trust	201 to 250	270	> 90% ●
		RNQ	Kettering General Hospital NHS Trust	101 to 150	127	> 90% ●
		RX1	Nottingham University Hospitals NHS Trust	201 to 250	393	> 90% ●
		RWE	University Hospitals of Leicester NHS Trust	251 to 300	416	> 90% ●
		RJF	Burton Hospitals NHS Foundation Trust	51 to 100	97	> 90% ●
CN06	West Midlands Strategic Clinical Network	RBK	Walsall Hospitals NHS Trust	101 to 150	77	61 to 70% ■
		RJC	South Warwickshire NHS Foundation Trust	51 to 100	45	71 to 80% ■
		RNA	Dudley Group of Hospitals NHS Foundation Trust	151 to 200	151	80 to 90% ●
		RKB	University Hospitals Coventry and Warwickshire NHS Trust	201 to 250	212	> 90% ●
		RR1	Heart of England NHS Foundation Trust	301 to 350	318	> 90% ●
		RL4	The Royal Wolverhampton Hospitals NHS Trust	151 to 200	158	> 90% ●
		RLT	George Eliot Hospital NHS Trust	51 to 100	59	> 90% ●
		RXW	The Shrewsbury and Telford Hospital NHS Trust	201 to 250	258	> 90% ●
		RJD	Mid Staffordshire NHS Foundation Trust	51 to 100	116	> 90% ●
		RJE	University Hospital of North Staffordshire NHS Trust	251 to 300	251	80 to 90% ●
		RXK	Sandwell and West Birmingham Hospitals NHS Trust	101 to 150	154	> 90% ●
		RWP	Worcestershire Acute Hospitals NHS Trust	201 to 250	249	> 90% ●
		RRK	University Hospital Birmingham NHS Foundation Trust	201 to 250	264	> 90% ●
		RLQ	Wye Valley NHS Trust	<50	86	> 90% ●
CN07	East of England Strategic Clinical Network	RC9	Luton and Dunstable University Hospital NHS Foundation Trust	51 to 100	81	80 to 90% ●
		RWG	West Hertfordshire Hospitals NHS Trust	101 to 150	132	> 90% ●
		RWH	East and North Hertfordshire NHS Trust	101 to 150	157	> 90% ●
		RC1	Bedford Hospital NHS Trust	51 to 100	120	> 90% ●
		RAJ	Southend University Hospital NHS Foundation Trust	101 to 150	115	80 to 90% ●
		RDE	Colchester Hospital University NHS Foundation Trust	101 to 150	141	> 90% ●
		RGP	James Paget University Hospitals NHS Foundation Trust	101 to 150	105	> 90% ●
		RQ8	Mid Essex Hospital Services NHS Trust	101 to 150	140	> 90% ●
		RDD	Basildon and Thurrock University Hospitals NHS Foundation Trust	51 to 100	103	> 90% ●
		RGQ	Ipswich Hospital NHS Trust	101 to 150	136	> 90% ●
		RM1	Norfolk and Norwich University Hospital NHS Foundation Trust	201 to 250	289	> 90% ●
		RCX	The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	101 to 150	132	> 90% ●
		RGT	Cambridge University Hospitals NHS Foundation Trust	201 to 250	278	> 90% ●
		RGN	Peterborough and Stamford Hospitals NHS Foundation Trust	101 to 150	145	> 90% ●
		RQQ	Hinchingbrooke Health Care NHS Trust	51 to 100	111	> 90% ●
		RGR	West Suffolk Hospitals NHS Foundation Trust	51 to 100	146	> 90% ●
CN08	London Strategic Clinical Network	RPY	The Royal Marsden NHS Foundation Trust	51 to 100	68	71 to 80% ■
		RAP	North Middlesex University Hospital NHS Trust	51 to 100	30	41 to 60% ▲
		RJ1	Guy's and St Thomas' NHS Foundation Trust	151 to 200	127	61 to 70% ■
		RJ7	St George's Healthcare NHS Trust	51 to 100	64	61 to 70% ■
		RC3	Ealing Hospital NHS Trust	<50	21	61 to 70% ■
		RVL	Barnet and Chase Farm Hospitals NHS Trust	101 to 150	73	71 to 80% ■
		RQW	The Princess Alexandra Hospital NHS Trust	51 to 100	62	71 to 80% ■
		RV8	North West London Hospitals NHS Trust	51 to 100	73	71 to 80% ■
		RAL	Royal Free Hampstead NHS Trust	51 to 100	61	> 90% ●
		RKE	The Whittington Hospital NHS Trust	<50	38	80 to 90% ●
		RJ2	Lewisham and Greenwich NHS Trust	<50	46	> 90% ●
		RYQ	South London Healthcare NHS Trust	201 to 250	225	> 90% ●
		RAS	The Hillingdon Hospital NHS Trust	51 to 100	56	> 90% ●
		RRV	University College London Hospitals NHS Foundation Trust	151 to 200	208	> 90% ●
		RF4	Barking, Havering and Redbridge University Hospitals NHS Trust	201 to 250	246	> 90% ●
		RQX	Homerton University Hospital NHS Foundation Trust	51 to 100	62	> 90% ●
		RVR	Epsom And St Helier University Hospitals NHS Trust	51 to 100	109	> 90% ●
		RQM	Chelsea and Westminster NHS Foundation Trust	51 to 100	60	> 90% ●
		RAX	Kingston Hospital NHS Trust	51 to 100	67	> 90% ●
		RFW	West Middlesex University Hospital NHS Trust	<50	49	> 90% ●
		RYJ	Imperial College Healthcare NHS Trust	151 to 200	228	> 90% ●

SCN Code	SCN Name	NHS Trust code	NHS Trust name	Expected cases based on HES (grouped)	Tumour records submitted to the audit	% Case ascertainment rate (grouped)
CN08	London Strategic Clinical Network	**RJ6**	Croydon Health Services NHS Trust	51 to 100	97	> 90% ●
		R1H	Barts Health NHS Trust	201 to 250	167	> 90% ●
		RGC	Whipps Cross University Hospital NHS Trust	50 to 100	79	> 90% ●
		RJZ	King's College Hospital NHS Foundation Trust	51 to 100	78	> 90% ●
CN09	Thames Valley Strategic Clinical Network	**RD8**	Milton Keynes Hospital NHS Foundation Trust	51 to 100	50	61 to 70% ■
		RHW	Royal Berkshire NHS Foundation Trust	101 to 150	100	61 to 70% ■
		RXQ	Buckinghamshire Healthcare NHS Trust	101 to 150	75	71 to 80% ■
		RD7	Heatherwood and Wexham Park Hospitals NHS Foundation Trust	51 to 100	78	71 to 80% ■
		RTH	Oxford University Hospitals NHS Trust	251 to 300	297	> 90% ●
		RN3	Great Western Hospitals NHS Foundation Trust	101 to 150	105	71 to 80% ■
CN10	South East Coast Strategic Clinical Network	**RDU**	Frimley Park Hospital NHS Foundation Trust	101 to 150	70	61 to 70% ■
		RVV	East Kent Hospitals University NHS Foundation Trust	251 to 300	217	80 to 90% ●
		RTK	Ashford and St Peter's Hospitals NHS Foundation Trust	51 to 100	67	71 to 80% ■
		RWF	Maidstone and Tunbridge Wells NHS Trust	201 to 250	233	> 90% ●
		RN7	Dartford and Gravesham NHS Trust	51 to 100	88	> 90% ●
		RA2	Royal Surrey County Hospital NHS Foundation Trust	101 to 150	150	> 90% ●
		RPA	Medway NHS Foundation Trust	101 to 150	95	80 to 90% ●
		RXC	East Sussex Healthcare NHS Trust	201 to 250	202	> 90% ●
		RTP	Surrey and Sussex Healthcare NHS Trust	51 to 100	89	> 90% ●
		RYR16	Western Sussex Hospitals NHS Foundation Trust	101 to 150	104	> 90% ●
		RYR18	Western Sussex Hospitals NHS Foundation Trust	51 to 100	95	> 90% ●
		RXH	Brighton and Sussex University Hospitals NHS Trust	101 to 150	187	> 90% ●
CN11	Wessex Strategic Clinical Network	**RBD**	Dorset County Hospitals NHS Foundation Trust	51 to 100	66	80 to 90% ●
		RD3	Poole Hospital NHS Foundation Trust	101 to 150	97	80 to 90% ●
		RN5	Hampshire Hospitals NHS Foundation Trust	101 to 150	95	80 to 90% ●
		RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	151 to 200	168	> 90% ●
		RN1	Winchester and Eastleigh Healthcare NHS Trust	<50	24	71 to 80% ■
		RNZ	Salisbury NHS Foundation Trust	51 to 100	71	> 90% ●
		RHM	Southampton University Hospitals NHS Trust	201 to 250	232	> 90% ●
		RHU	Portsmouth Hospitals NHS Trust	251 to 300	295	> 90% ●
		R1F	Isle of Wight NHS Trust	<50	42	> 90% ●
CN12	South West Coast Strategic Clinical Network	**RA4**	Yeovil District Hospital NHS Foundation Trust	51 to 100	44	71 to 80% ■
		RD1	Royal United Hospital Bath NHS Trust	101 to 150	95	71 to 80% ■
		RBZ	Northern Devon Healthcare NHS Trust	51 to 100	59	80 to 90% ●
		RVJ	North Bristol NHS Trust	101 to 150	114	80 to 90% ●
		RTE	Gloucestershire Hospitals NHS Foundation Trust	251 to 300	274	> 90% ●
		RA3	Weston Area Health NHS Trust	51 to 100	59	> 90% ●
		RA9	South Devon Healthcare NHS Foundation Trust	101 to 150	122	> 90% ●
		RH8	Royal Devon and Exeter NHS Foundation Trust	151 to 200	168	> 90% ●
		REF	Royal Cornwall Hospitals NHS Trust	151 to 200	189	> 90% ●
		RBA	Taunton and Somerset NHS Foundation Trust	101 to 150	155	> 90% ●
		RA7	University Hospitals Bristol NHS Foundation Trust	151 to 200	258	> 90% ●
		RK9	Plymouth Hospitals NHS Trust	151 to 200	278	> 90% ●

NOTE: Three Trusts were not included in this Annex, as they are tertiary treatment centres only.

Annex 4: Data completeness for Surgical and Pathology records
(over 2012-2013, 1 year of data)

Completeness of data entered by each trust for key fields, was calculated for all patients who had a surgical record submitted. Furthermore all patients who have surgery should have a corresponding pathology record, so we analysed the proportion who did for each trust.

Finally considering only patients who had a pathology record submitted to the audit. We looked at data completeness in recording TNM stage, where TX, NX and MX were considered as missing data.

Key

As surgical intent is a crucial indicator.	Death in Hospital.	Other indicators:
● 100% complete	● data completeness above 95%	● data completeness above 90%
▲ <100% complete	■ data completeness between 90-95%	■ data completeness between 80-90%
	▲ data completeness less than 90%.	▲ data completeness less than 80%.

SCN	SCN Name	Trust code	Trust Name	No. surgical cases	% with surgical intent*	% with complications	% with death in hospital	% with matched pathology record	% with T-stage**	% with N stage**	% with M stage**
CN01	Northern England Strategic Clinical Network	RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust	155	● 100.0%	● 96.0%	● 98.9%	● 92.1%	● 99.4%	● 99.4%	● 100.0%
		RTR	South Tees Hospitals NHS Trust	77	● 100.0%	● 100.0%	● 100.0%	■ 83.0%	● 98.6%	● 100.0%	● 100.0%
CN02	Greater Manchester, Lancashire and South Cumbria Strategic Clinical Network	RW3	Central Manchester University Hospitals NHS Foundation Trust	52	● 100.0%	● 98.3%	● 100.0%	■ 89.8%	● 100.0%	● 100.0%	● 100.0%
		RM3	Salford Royal Hospitals NHS Foundation Trust	90	● 100.0%	● 100.0%	● 100.0%	● 90.2%	● 98.9%	● 100.0%	● 100.0%
		RXN	Lancashire Teaching Hospitals NHS Foundation Trust	93	● 100.0%	▲ 79.2%	● 99.0%	● 95.8%	● 100.0%	● 100.0%	● 100.0%
		RM2	University Hospital of South Manchester NHS Foundation Trust	22	● 100.0%	▲ 34.8%	▲ 21.7%	● 91.3%	● 100.0%	● 100.0%	● 100.0%
CN03	Yorkshire and the Humber Strategic Clinical Network	RR8	Leeds Teaching Hospitals NHS Trust	76	● 100.0%	▲ 1.3%	■ 94.9%	● 98.7%	● 98.7%	● 100.0%	● 100.0%
		RWA	Hull and East Yorkshire Hospitals NHS Trust	58	● 100.0%	● 95.1%	● 95.1%	● 95.1%	● 100.0%	● 100.0%	● 100.0%
		RAE	Bradford Teaching Hospitals NHS Foundation Trust	48	● 100.0%	▲ 0.0%	● 98.0%	● 100.0%	● 100.0%	● 98.0%	● 100.0%
		RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	51	● 100.0%	● 92.1%	● 95.2%	■ 88.9%	● 100.0%	● 100.0%	● 94.6%
		RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust	24	● 100.0%	▲ 71.8%	● 97.4%	■ 82.1%	● 100.0%	● 100.0%	▲ 68.8%
CN04	Cheshire and Merseyside Strategic Clinical Network	REM	Aintree University Hospital NHS Foundation Trust	35	● 100.0%	● 97.7%	● 100.0%	■ 84.1%	● 100.0%	● 100.0%	● 100.0%
		RBQ	Liverpool Heart and Chest Hospital	95	▲ 99.1%	■ 88.2%	● 100.0%	▲ 69.1%	● 100.0%	● 100.0%	● 98.7%
CN05	East Midlands Strategic Clinical Network	RX1	Nottingham University Hospitals NHS Trust	110	● 100.0%	● 98.3%	● 100.0%	● 95.0%	● 100.0%	● 100.0%	● 100.0%
		RTG	Derby Hospitals NHS Foundation Trust	59	● 100.0%	■ 86.6%	■ 94.0%	■ 89.6%	● 100.0%	● 100.0%	● 100.0%
		RWE	University Hospitals of Leicester NHS Trust	62	● 100.0%	● 100.0%	● 100.0%	■ 89.7%	● 100.0%	● 98.4%	● 100.0%
CN06	West Midlands Strategic Clinical Network	RKB	University Hospitals Coventry and Warwickshire NHS Trust	59	● 100.0%	● 100.0%	● 100.0%	● 96.8%	● 98.3%	● 98.3%	● 100.0%
		RRK	University Hospital Birmingham NHS Foundation Trust	70	● 100.0%	▲ 39.7%	● 100.0%	● 93.6%	● 98.6%	● 100.0%	● 100.0%
		RR1	Heart of England NHS Foundation Trust	25	● 100.0%	● 96.0%	▲ 88.0%	● 96.0%	● 100.0%	● 100.0%	● 95.8%
		RJE	University Hospital of North Staffordshire NHS Trust	61	● 100.0%	● 95.2%	▲ 40.3%	▲ 3.2%	● 100.0%	● 100.0%	● 100.0%
CN07	East of England Strategic Clinical Network	RWG	West Hertfordshire Hospitals NHS Trust	45	● 100.0%	● 96.2%	■ 94.3%	■ 86.8%	● 100.0%	● 100.0%	▲ 71.7%
		RQ8	Mid Essex Hospital Services NHS Trust	60	▲ 98.6%	▲ 73.6%	▲ 73.6%	▲ 72.2%	● 100.0%	● 100.0%	● 98.1%
		RGT	Cambridge University Hospitals NHS Foundation Trust	71	● 100.0%	● 98.7%	● 100.0%	■ 88.0%	● 100.0%	● 100.0%	● 100.0%
		RM1	Norfolk and Norwich University Hospital NHS Foundation Trust	52	● 100.0%	● 100.0%	● 100.0%	● 98.2%	● 100.0%	● 100.0%	● 100.0%
CN08	London Strategic Clinical Network	R1H	Barts Health NHS Trust	39	● 100.0%	● 100.0%	● 100.0%	■ 84.2%	● 100.0%	● 100.0%	● 100.0%
		RJ1	Guy's and St Thomas' NHS Foundation Trust	68	▲ 98.8%	▲ 45.0%	■ 93.8%	● 91.3%	● 100.0%	● 100.0%	● 94.5%
		RRV	University College London Hospitals NHS Foundation Trust	52	● 100.0%	■ 81.1%	● 100.0%	■ 85.1%	● 100.0%	● 100.0%	● 98.4%
		RF4	Barking, Havering and Redbridge University Hospitals NHS Trust	32	● 100.0%	● 100.0%	● 100.0%	▲ 77.1%	● 100.0%	● 100.0%	● 100.0%
		RYJ	Imperial College Healthcare NHS Trust	48	● 100.0%	● 96.0%	● 100.0%	● 98.0%	● 100.0%	● 100.0%	● 100.0%
		RPY	The Royal Marsden NHS Foundation Trust	48	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%
CN09	Thames Valley Strategic Clinical Network	RHW	Royal Berkshire NHS Foundation Trust	23	● 100.0%	● 100.0%	● 100.0%	● 95.7%	● 100.0%	● 100.0%	● 100.0%
		RTH	Oxford University Hospitals NHS Trust	75	● 100.0%	● 100.0%	● 98.8%	● 92.6%	● 100.0%	● 100.0%	● 100.0%
CN10	South East Coast Strategic Clinical Network	RWF	Maidstone and Tunbridge Wells NHS Trust	48	● 100.0%	▲ 41.2%	▲ 70.6%	▲ 76.5%	● 97.4%	● 100.0%	● 100.0%
		RXH	Brighton and Sussex University Hospitals NHS Trust	17	● 100.0%	▲ 66.7%	▲ 88.9%	▲ 61.1%	● 100.0%	● 100.0%	● 100.0%
		RA2	Royal Surrey County Hospital NHS Foundation Trust	54	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%
CN11	Wessex Strategic Clinical Network	RHU	Portsmouth Hospitals NHS Trust	57	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%	● 100.0%
		RHM	Southampton University Hospitals NHS Trust	58	● 100.0%	● 100.0%	● 98.5%	● 94.1%	● 100.0%	● 100.0%	● 100.0%
		RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	30	● 100.0%	● 90.6%	● 90.6%	● 100.0%	● 93.8%	● 96.9%	● 90.6%
CN12	South West Coast Strategic Clinical Network	RTE	Gloucestershire Hospitals NHS Foundation Trust	37	● 100.0%	● 100.0%	● 97.6%	■ 88.1%	● 100.0%	● 100.0%	▲ 10.8%
		RA7	University Hospitals Bristol NHS Foundation Trust	71	● 100.0%	● 98.8%	● 98.8%	■ 84.7%	● 100.0%	● 100.0%	● 100.0%
		RK9	Plymouth Hospitals NHS Trust	106	● 100.0%	■ 82.3%	● 100.0%	● 93.8%	● 100.0%	● 100.0%	● 100.0%
North Wales	North Wales	7A1	Betsi Cadwaladr University Local Health Board	43	● 100.0%	NA	● 97.7%	▲ 67.4%	● 100.0%	● 96.6%	● 100.0%
South Wales	South Wales	7A3	Abertawe Bro Morgannwg University Local Health Board	19	● 100.0%	NA	● 100.0%	▲ 47.4%	■ 88.9%	● 100.0%	● 100.0%
		7A4	Cardiff and Vale University Local Health Board	20	● 100.0%	NA	● 100.0%	■ 85.0%	● 100.0%	● 100.0%	● 100.0%

* Mandatory items (% of responses that are not 'not known' or 'not applicable' for given data items)

NA - Welsh data is extracted directly from CaNISC, and this datasource does not provide any details as to complications occurring in Wales.

Trusts with < 10 cases not shown

Annex 5: Comparative analysis of outcomes after curative surgery for NHS trusts in England and Wales

(over 2011-13, 2 years of data)

The overall volume of procedures based on two years of audit data is small and as post-operative 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 ten cases per year are not reported here.

SCN	SCN Name	Trust Code	Trust Name	No. surgical cases	30 day mortality - adjusted %	90 day mortality - adjusted %	Complication rate - adjusted& %	Adequate lymph node resection$ %	Positive resection margin %	Length of stay (in days)
CN01	Northern England Strategic Clinical Network	RTR	South Tees Hospitals NHS Foundation Trust	142	0.0	1.7	13.5	82.1	14.8	12
		RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust	296	0.7	2.6	32.9	95.3	2.1	14
CN02	Greater Manchester, Lancashire And South Cumbria Strategic Clinical Network	RW3	Central Manchester University Hospitals NHS Foundation Trust	85	4.2	7.1	45.2	83.8	6.5	14
		RXN	Lancashire Teaching Hospitals NHS Foundation Trust	170	2.9	3.2	9.5	83.7	4.4	13
		RM3	Salford Royal Hospitals NHS Foundation Trust	180	1.3	3.1	24.3	85.3	5.6	13
		RM2	University Hospital of South Manchester NHS Foundation Trust	42	0.0	0.0	5.5	92.7	9.8	13
CN03	Yorkshire and the Humber Strategic Clinical Network	RWA	Hull and East Yorkshire Hospitals NHS Trust	133	4.1	7.2	31.8	87.7	3.5	12
		RAE	Bradford Teaching Hospitals NHS Foundation Trust	100	4.4	5.4	19.0	92.9	8.5	15
		RR8	Leeds Teaching Hospitals NHS Trust	184	2.2	5.2	0.0	89.2	4.4	13
		RP5	Doncaster and Bassetlaw Hospitals NHS Foundation Trust	59	6.7	8.9	30.4	88.2	2.0	14
		RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	111	2.0	3.0	28.9	61.5	6.7	12
CN04	Cheshire and Merseyside Strategic Clinical Network	RBQ	Liverpool Heart and Chest Hospital	182	1.4	5.0	17.8	83.2	4.6	12
		REM	Aintree University Hospital NHS Foundation Trust	68	3.9	5.5	28.8	95.3	3.1	12
CN05	East Midlands Strategic Clinical Network	RX1	Nottingham University Hospitals NHS Trust	216	2.0	4.4	36.8	90.6	6.3	11
		RWE	University Hospitals of Leicester NHS Trust	124	2.5	5.1	41.5	77.2	4.9	15
		RWD	United Lincolnshire Hospitals NHS Trust	16	7.4	13.5	47.0	76.9	23.1	9
		RTG	Derby Hospitals NHS Foundation Trust	97	1.0	2.9	38.5	87.6	6.3	10
CN06	West Midlands Strategic Clinical Network	RR1	Heart of England NHS Foundation Trust	48	5.4	7.8	17.9	100.0	13.3	14
		RKB	University Hospitals Coventry and Warwickshire NHS Trust	110	2.0	6.1	14.8	89.0	9.3	10
		RRK	University Hospital Birmingham NHS Foundation Trust	131	6.3	6.1	23.1	98.4	2.4	12
		RJE	University Hospital of North Staffordshire NHS Trust	66	0.0	2.0	0.0	75.0	0.0	13
CN07	East Of England Strategic Clinical Network	RWG	West Hertfordshire Hospitals NHS Trust	88	4.3	6.3	41.5	89.0	7.1	11
		RM1	Norfolk and Norwich University Hospital NHS Foundation Trust	116	0.5	0.5	25.4	93.1	1.7	9
		RGT	Cambridge University Hospitals NHS Foundation Trust	142	1.4	4.3	4.1	78.6	2.2	12
		RQ8	Mid Essex Hospital Services NHS Trust	119	7.5	10.1	24.6	96.3	2.8	12
CN08	London Strategic Clinical Network	RPY	The Royal Marsden NHS Foundation Trust	91	2.2	5.8	40.7	96.7	2.2	13
		RRV	University College London Hospitals NHS Foundation Trust	102	0.0	0.9	32.1	91.1	10.0	13
		RJ1	Guy's and St Thomas' NHS Foundation Trust	136	0.0	2.0	13.0	91.9	7.3	13
		RF4	Barking, Havering and Redbridge University Hospitals NHS Trust	69	0.0	0.0	15.9	93.5	4.0	10
		R1H	Barts Health NHS Trust	83	2.2	4.0	36.6	93.3	3.7	12
		RYJ	Imperial College Healthcare NHS Trust	105	0.0	2.2	50.5	100.0	3.6	14
CN09	Thames Valley Strategic Clinical Network	RHW	Royal Berkshire NHS Foundation Trust	40	4.1	4.4	28.9	94.1	11.8	9
		RTH	Oxford University Hospitals NHS Trust	135	1.0	4.1	52.1	91.7	3.0	12
CN10	South East Coast Strategic Clinical Network	RXH	Brighton and Sussex University Hospitals NHS Trust	43	2.7	5.0	16.4	82.4	0.0	10
		RA2	Royal Surrey County Hospital NHS Foundation Trust	137	3.7	6.0	36.8	99.0	2.8	10
		RWF	Maidstone and Tunbridge Wells NHS Trust	116	5.8	8.9	43.7	85.9	7.5	14
CN11	Wessex Strategic Clinical Network	RHU	Portsmouth Hospitals NHS Trust	99	2.4	3.7	52.2	92.8	6.3	12
		RHM	Southampton University Hospitals NHS Trust	115	3.4	4.8	27.0	91.3	2.6	10
		RDZ	Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	72	1.7	3.1	0.0	90.1	0.0	10
CN12	South West Strategic Clinical Network	RTE	Gloucestershire Hospitals NHS Foundation Trust	87	5.7	7.4	46.9	90.7	5.9	13
		RA7	University Hospitals Bristol NHS Foundation Trust	142	3.3	5.1	42.5	91.9	7.9	11
		RK9	Plymouth Hospitals NHS Trust	200	0.0	2.0	2.1	92.1	11.8	10
North Wales	North Wales	7A1	Betsi Cadwaladr University Health Board	88	0.0	2.7	**	92.5	9.5	15
South Wales	South Wales	7A2	Hywel Dda Local Health Board	19	0.0	0.0	**	80.0	22.2	13
		7A3	Abertawe Bro Morgannwg University Local Health Board	42	0.0	0.0	**	63.2	6.3	2
		7A4	Cardiff and Vale University Local Health Board	31	4.6	11.0	**	70.8	12.5	16

$ Adequate lymph node resection defined as minimum of 6 lymph nodes resected for oesophagectomy or 15 for gastrectomy.

& Rate of ANY complication after surgery, adjusted for age, sex

** Welsh data supplied by CaNISC which does not collect data on complications.

Rates of complications, lymph node dissection and positive resection margins need to be interpreted with caution, as they may be affected by coding practices at trust level.

Trusts with less then 10 cases not shown

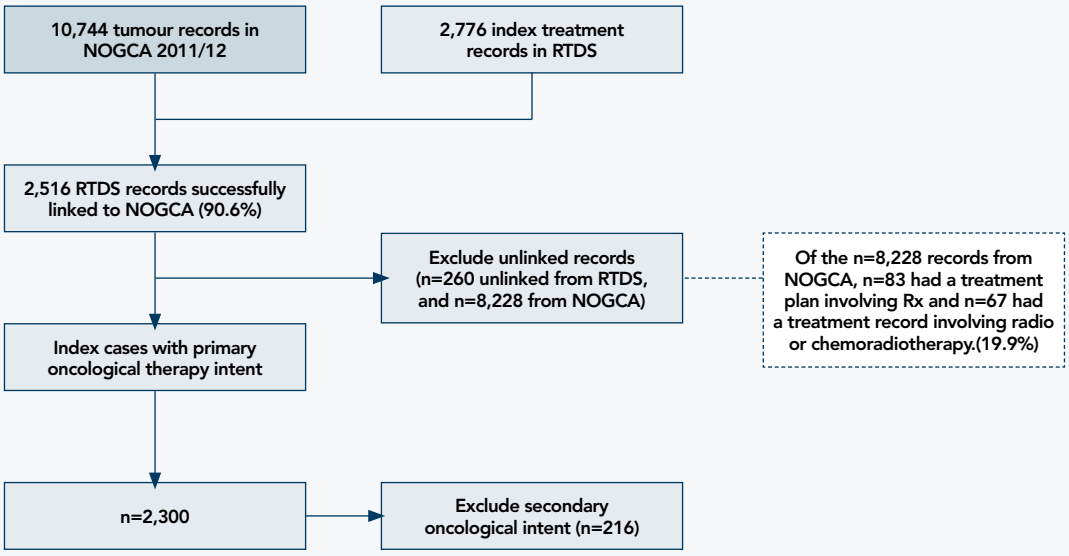
Annex 6: Analysis of NOGCA – RTDS linked dataset

The radiotherapy dataset (RTDS) was linked to the National Oesophago-Gastric Cancer Audit (NOGCA) patient identifiers, matching on NHS number, age/gender and postcode (2011/12 data only). After removal of 279 empty records, the RTDS summary record contained information on **3,224 episodes of care**. The linkage was successful for all but two patients. All others were linked based on at least NHS number (46.4 per cent) and the majority (53.5 per cent) linked based on NHS number, age, gender and postcode.

The majority of patients **(n=2,776, 86.1 per cent) had a single RTDS record**, while 332 (10.3 per cent) had two, 79 (2.5 per cent) had three and 37 (1.1 per cent) had more than three RTDS records. Only index records (n=2,776) were kept for the merge with the NOGCA dataset (England only, n=10,744).

2,516 (90.6 per cent) records of the RTDS were successfully linked to a record in the NOGCA dataset. 260 were included in the RTDS dataset but had no correspondent in the NOGCA dataset. These are potentially cases missed by the NOGCA. 8,228 NOGCA records had no correspondent in the RTDS dataset. Of these, the majority had a treatment plan that did not involve radiotherapy: only 83 patients had a treatment plan that involved radiotherapy and only 67 had an actual treatment record involving radiotherapy. These 67 cases may reflect cases potentially missed in RTDS (Table 0-1).

Table 0-1
Data Linkage NOGCA-RTDS



The most common treatment modality in the linked dataset was palliative oncology (n=963), followed by curative radiotherapy (n=114) and definitive chemoradiotherapy (n=325). By tumour type, the most frequent treatments were palliative oncology for lower/Siewert 1 tumours (n=362), followed by palliative oncology (n=318) and definitive chemoradiotherapy (n=219) for oesophageal squamous cell carcinoma (Table 0-2).

Table 0-2
Treatment modalities used in the linked dataset, by tumour type

Modality	Oesoph SCC	Oesoph Adenca Upp/Mid	Oesoph Adenca Low/SI	GOJ SII/SIII	Stomach	Total
Surgery Alone %	1.8	6.4	2.1	2.7	7.3	**2.9**
Radiotherapy Alone %	7.4	4.3	6.8	4.4	0.5	**6.0**
Chemo and Surgery %	7.0	14.9	14.9	14.2	13.5	**11.6**
Definitive Chemoradiotherapy %	29.9	7.8	11.3	6.6	1.0	**17.0**
Chemoradiotherapy and surgery %	1.2	0.7	1.0	0.6	0.0	**0.9**
Endoscopic mucosal resection %	0.3	1.4	1.2	1.1	0.0	**0.7**
Palliative surgery %	0.6	0.0	0.6	0.0	1.6	**0.6**
Palliative oncology %	43.4	53.2	50.1	64.5	50.4	**50.5**
Endoscopic palliation %	3.8	1.4	3.3	1.1	2.6	**3.1**
Supportive care %	4.6	9.9	6.7	4.9	13.0	**6.6**
Total	**732**	**141**	**659**	**183**	**192**	**1,907**
Missing	142	37	143	36	35	**393**

This is the first time the NOGCA dataset was linked to the National Radiotherapy dataset. The results of the linkage process demonstrate high levels of case-ascertainment of the NOGCA, assuming RTDS as a gold standard with 100.0 per cent capture of radiotherapy episodes.

Overall, the majority (90.6 per cent) of RTDS records were successfully linked to NOGCA. The differential n= 260 RTDS index cases not linked to a NOGCA record may reflect cases that were not submitted to the NOGCA. Of the 8,228 NOGCA cases not linked to RTDS the majority had a treatment plan that did not involve radiotherapy, but 67 cases might have been missed by RTDS.

The link rate at the level of individual Trusts was high.

NOGCA RTDS data linkage (over 2012-2013, 1 year of data)

We report on the percentage of cases successfully linked at the level of individual NHS Trusts.

Key
● estimated case-ascertainment above 90%
■ estimated case-ascertainment between 80-90%
▲ estimated case-ascertainment rates below 80%

SCN Code	SCN Name	Trust	Trust Name	No. radiotherapy records in RTDS	No. radiotherapy records in NOGCA	Audit case ascertainment %
CN01	Northern England Strategic Clinical Network	RNL	North Cumbria University Hospitals NHS Trust	22	22	● 100
		RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust	98	91	● 93
		RTR	South Tees Hospitals NHS Foundation Trust	46	45	● 98
CN02	Greater Manchester, Lancashire and South Cumbria Strategic Clinical Network	RBV	The Christie Hospital NHS Foundation Trust	106	106	● 100
		RXN	Lancashire Teaching Hospitals NHS Foundation Trust	40	40	● 100
CN03	Yorkshire and the Humber Strategic Clinical Network	RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	142	122	■ 86
		RR8	Leeds Teaching Hospitals NHS Trust	146	136	● 93
		RWA	Hull and East Yorkshire Hospitals NHS Trust	88	75	■ 85
CN04	Cheshire and Merseyside Strategic Clinical Network	REN	The Clatterbridge Centre NHS Foundation Trust	128	125	● 98
CN05	East Midlands Strategic Clinical Network	RNS	Northampton General Hospital NHS Trust	58	51	■ 88
		RTG	Derby Hospitals NHS Foundation Trust	35	35	● 100
		RWD	United Lincolnshire Hospitals NHS Trust	27	6	▲ 22
		RWE	University Hospitals of Leicester NHS Trust	64	64	● 100
		RX1	Nottingham University Hospitals NHS Trust	37	34	● 92
		RJE	University Hospital of North Staffordshire NHS Trust	32	32	● 100
		RKB	University Hospitals Coventry and Warwickshire NHS Trust	50	46	● 92
		RL4	The Royal Wolverhampton Hospitals NHS Trust	21	21	● 100
		RRK	University Hospital Birmingham NHS Foundation Trust	56	56	● 100
		RXW	The Shrewsbury and Telford Hospital NHS Trust	19	19	● 100
CN07	East of England Strategic Clinical Network	RAJ	Southend University Hospital NHS Foundation Trust	38	29	▲ 76
		RDE	Colchester Hospital University NHS Foundation Trust	48	43	■ 90
		RGN	Peterborough and Stamford Hospitals NHS Foundation Trust	10	10	● 100
		RGQ	Ipswich Hospital NHS Trust	31	30	● 97
		RGT	Cambridge University Hospitals NHS Foundation Trust	58	57	● 98
		RM1	Norfolk and Norwich University Hospital NHS Foundation Trust	58	54	● 93
		RWH	East and North Hertfordshire NHS Trust	130	116	■ 89
CN08	London Strategic Clinical Network	R1H	Barts Health NHS Trust	19	19	● 100
		RAL	Royal Free Hampstead NHS Trust	21	13	▲ 62
		RAP	North Middlesex University Hospital NHS Trust	32	23	▲ 72
		RF4	Barking, Havering and Redbridge University Hospitals NHS Trust	24	24	● 100
		RJ1	Guy's and St Thomas' NHS Foundation Trust	93	79	■ 85
		RPY	The Royal Marsden NHS Foundation Trust	98	89	● 91
		RRV	University College London Hospitals NHS Foundation Trust	53	40	▲ 75
		RYJ	Imperial College Healthcare NHS Trust	38	33	■ 87
CN09	Thames Valley Strategic Clinical Network	RHW	Royal Berkshire NHS Foundation Trust	23	23	● 100
		RTH	Oxford University Hospitals NHS Trust	101	99	● 98
CN10	South East Coast Strategic Clinical Network	RA2	Royal Surrey County Hospital NHS Foundation Trust	40	39	● 98
		RWF	Maidstone and Tunbridge Wells NHS Trust	137	73	▲ 53
		RXH	Brighton and Sussex University Hospitals NHS Trust	51	51	● 100
CN11	Wessex Strategic Clinical Network	RD3	Poole Hospital NHS Foundation Trust	41	41	● 100
		RHM	Southampton University Hospitals NHS Trust	40	35	■ 88
		RHU	Portsmouth Hospitals NHS Trust	61	61	● 100
CN12	South West Strategic Clinical Network	RA7	University Hospitals Bristol NHS Foundation Trust	51	50	● 98
		RA9	South Devon Healthcare NHS Foundation Trust	17	15	■ 88
		RBA	Taunton and Somerset NHS Foundation Trust	23	22	● 96
		RD1	Royal United Hospital Bath NHS Trust	10	10	● 100
		REF	Royal Cornwall Hospitals NHS Trust	21	21	● 100
		RH8	Royal Devon and Exeter NHS Foundation Trust	36	35	● 97
		RK9	Plymouth Hospitals NHS Trust	29	29	● 100
		RTE	Gloucestershire Hospitals NHS Foundation Trust	129	127	● 98

Annex 7: Data submission errors

Review of the National Oesophago-Gastric Cancer Audit (NOGCA) dataset revealed several common areas where errors were noted in data submitted. This chapter seeks to highlight problem areas in order to improve data quality in future years.

Tumour Record

Treatment Plan

This section examines both treatment intent and planned modality. We aimed to identify cases where data was inconsistent. This highlighted a key area of concern; 370 patients had **'Definitive radiotherapy'** recorded as the planned modality, but both treatment intent and oncology intent were recorded as palliative. This suggests the correct planned modality should have been **'Palliative Oncology'** instead. In eight Trusts more than ten cases had their planned modality incorrectly recorded as definitive oncology.

Surgical Record

Procedure

Review of the surgical records revealed 100 cases where the **main procedure** recorded did not correspond with the type of cancer.

Type of Error	Frequency of error
Oeosphagectomy for gastric cancer	48
Gastrectomy for upper oesophageal cancer	23
Distal gastrectomy for GOJ cancer	23
Open shut laparotomy for upper oesophageal cancer	6

Through data linkage with HES (Hospital Episode Statistics) we looked into common reasons behind these errors. **It resulted from errors both in entry of tumour site and in incorrect recording of main procedure,** highlighting the need for careful data entry with clarification from clinicians where there is uncertainty about the correct tumour site and procedure to record. There was also a subset of patients who had incorrect data recorded apparently due to lack of understanding of anatomy, e.g. incorrect recording of 'distal gastrectomy' in patients with gastro-oesophageal junction (GOJ) tumours.

Oncology Record

These were the records causing the greatest problem with errors in data entry.

Number of oncology records to submit

Incorrect use of two oncology records (n=115)
This can occur in several circumstances, and each situation only one record should have been submitted to the audit.

- Use of both chemotherapy and radiotherapy preoperatively or in patient not undergoing surgery, both submitted on different records. In some circumstances this is unavoidable due to different treatments being provided by different hospitals, but in general both treatments should be recorded on a single record.
- Use of two courses of chemotherapy or radiotherapy in patients managed without surgery. In this situation only the initial treatment course should be recorded.

The only situation where two records need to be submitted is to record oncology treatments pre and post- operatively.

Incorrect use of one oncology record (n=39)

Where patients receive different oncology treatments pre and post-operatively these should be recorded on two separate oncology records. This allows correct recording of all oncology details including oncology treatment.

Oncology Intent

This refers to the intent of the oncology treatment at the start of treatment. There was a frequent problem with incorrect coding of oncology intent, such as patients who had never had an operation were recorded to receive adjuvant therapy.

Examples of common errors	Frequency of error
Oncology treatment preoperatively incorrectly recorded as palliative, curative or adjuvant, when should have been **neoadjuvant**	332
Oncology treatment post-operatively incorrectly recorded as palliative, curative or neoadjuvant, when should have been **adjuvant**	136
Oncology treatment incorrectly recorded adjuvant when patient had no surgical record	99
Oncology treatment incorrectly recorded as neoadjuvant or adjuvant in patients planned to receive definitive oncology who had no surgical record, when should have been **curative**	137
Oncology treatment incorrectly recorded as curative, neoadjuvant or adjuvant, when planned treatment palliative oncology and planned intent palliative, should have been **palliative**	164

It is therefore important to be clear in the medical notes whether the oncology treatment is:

- Neoadjuvant: Oncology treatment given with curative intent, before planned operation.
- Adjuvant: Oncology treatment given with curative intent, after operation.
- Curative: Oncology treatment given with curative intent in patient who has not had and is not planned to have an operation.

This will enable non-clinical staff entering audit data records to correctly record oncology intent.

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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.

AUGIS – Association of Upper Gastrointestinal Surgeons

BSG – British Society of Gastroenterologists

No active treatment (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.

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 Mucosal Resection/ Endoscopic Submucosal Dissection – a procedure to remove cancerous or other abnormal tissues (lesions) using a long narrow tube equipped with a light, camera and other instruments, which is passed down the oesophagus.

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.

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.

Neoadjuvant 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 Care 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.

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.

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.

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

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