Methodology Supplement for the National Oesophago-Gastric Cancer Audit State of the Nation Report

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Introduction

This document accompanies the NOGCA State of the Nation report published in January 2025. The purpose of this document is to provide detail on the data sources and methods used to manage and analyse the data.

Data sources

The State of the Nation Report uses Rapid Cancer Registration Data (RCRD) for England, which at the time of analyses for this report was available for people diagnosed up to the end of January 2024. This rapid data set provides a quicker, indicative source of cancer data compared to the "Gold standard" National Cancer Registration Data (NCRD), which has a lag of over two years.

The NOGCA's data collection partner in Wales is the Wales Cancer Network (WCN), Public Health Wales. The NOGCA dataset is captured through a national system, Cancer Information System Cymru (CaNISC), after identification by hospital cancer services and uploaded via electronic MDT data collection systems.

Completeness of cancer registrations

RCRD contains proxy tumour registrations and some associated events on the cancer patient pathway (e.g. surgery, radiotherapy and chemotherapy) from January 2018 to the most recently available data on cancer diagnoses. This rapid data set provides a quicker, indicative source of cancer data compared to the "Gold standard" National Cancer Registration Data (NCRD), which relies on additional data sources, enhanced follow-up with trusts and expert processing by cancer registration officers. Due to these differences in processing, the rapid registration data will not exactly match the eventual Official Statistics published using the NCRD. Rapid cancer registration data are typically available within 4-5 months post-diagnosis.

Country	Data source	Content
England	RCRD	The Rapid Cancer Registration Dataset (RCRD) contains proxy tumour registrations and some associated events on the cancer patient pathway. This rapid data set provides a quicker, indicative source of cancer data compared to the "Gold standard" National Cancer Registration Data (NCRD).
England	COSD	The Cancer Outcomes and Services dataset (COSD) provides the national standard for information that is required to support cancer registration and other national activities, including cancer audit programmes. COSD items are submitted routinely by service providers via multidisciplinary team (MDT) electronic data collection systems
England	SACT	The Systemic Anti-Cancer Therapy (SACT) dataset contains information on disease modifying cancer therapies, such as chemotherapy and immunotherapy, delivered by NHS providers. It provides information on regimen(s), dose, and dates of treatment
England	RTDS	The Radiotherapy dataset (RTDS) contains information on radiotherapy delivered by NHS providers, and includes information on dates, prescription region, dose, and fractionation

Country	Data source	Content
England	HES - APC	Hospital Episode Statistics – Admitted patient care (HES-APC) is the administrative database of all NHS hospital admissions in England; the Audit uses information on hospital care both before and after cancer diagnosis
England	CWT	Cancer Waiting Times (CWT) contains data on dates of referrals, diagnoses, and treatments, as well as source of referrals. This information is uploaded monthly by NHS providers and is used to monitor cancer waiting times
Wales	Cancer Cohort data	The cohort dataset contains data on all cancers diagnosed and registered in Wales. It includes information on all aspects of the registration, including investigations, and treatments (including chemotherapy and radiotherapy treatment information).
Wales	PEDW	The Patient Episode Database for Wales (PEDW) is an administrative database that contains information on all NHS hospital admissions in Wales.
Wales	ONS	Office for National Statistics dataset contains information on the date of death and cause of death
Wales	LSOA	Lower-layer Super Output Areas (LSOA) dataset contains information on deprivation in small areas (LSOAs) across Wales

The data sources for England were merged based on pseudo patient ID. The data sources for Wales were merged based on patient ID.

Data for England and Wales were managed and analysed separately.

Key data item sources

Data item	Source variable / approach to deriving variable	
	England	**Wales**
Patient characteristics (at time of diagnosis)		
Age at diagnosis	Calculated as diagnosisdate (RCRD) minus date of birth, with date of birth derived from birthmonth (RCRD) and birthyear (RCRD), with the date set to 1st of the month	Derived using the age at the start of the hospital episode closest to the date of diagnosis (episodestartdate and patientepisodestartageyears, from PEDW).
Index of multiple deprivation	quintile_2019 (RCRD)	Deprivationquintile (LSOA)
Performance status	tumour_performancestatus (RCRD)	performance-status (Cohort data)
Sex	gender (RCRD)	gender (Cohort data)
Stage	stage (RCRD) Derivations: - Stage 0 recoded as stage 1 - Missing stage recorded as stage 4 if tumour_morphology (RCRD) ended with behaviour code of 6 (metastatic) or if basisofdiagnosis (RCRD) was "histology of a metastasis"	Derived using 3 variables (from Cohort data): t_stage_final_pretreatment, n_stage_final_pretreatment and m_stage_final_pretreatment to generate overall stage using the AJCC (American Joint Committee on Cancer staging) clinical stage coding for oesophageal and stomach cancer version 8 [1].
Tumour site & sub-type	tumour_site (RCRD) See Table 1 & Table *2* for ICD-10 codes and morphology codes for subtypes, respectively	tumour_site (Cohort data) morphology_description
Organisation of diagnosis (Trust or local health board)	diagnosis_trust (RCRD) Exceptions: for tertiary centres listed as trust of diagnosis (Christie, Clatterbridge, Royal Marsden), reallocated diagnoses to trust of endoscopy by searching HES for endoscopy OPCS-4 codes within +/- 30 days of diagnosis date. Royal Marsden did have records of endoscopy in HES and therefore remained as the trust of diagnosis for some patients	organisation_code (Cohort data)
Time from referral to start of treatment		
Diagnosis date	diagnosisdate (RCRD)	diagnosis_date (Cohort data)
Referral date	crtp_date (CWT)	date_of_referral (Cohort data)

[1] MB Amin, SB Edge, FL Greene, et al, eds. AJCC Cancer Staging Manual. 8th ed. New York: Springer; 2017.

Data item	Source variable / approach to deriving variable	
	England	**Wales**
Referral source	ref_source (CWT) Grouped as follows: *GP referral:* 3 - "General medical practitioner" or 12 - "General practitioner with extended role" *Emergency:* 1 "Following emerg admission" or 4 "Emergency Care Department" or 10 "Following an Emergency Care Attendance" *Other Consultant:* 2 "Following Consultant domiciliary consultation" or 5 "CONSULTANT - not emergency care" or 11 "Consultant initiated - other" *Other:* all other options	source_of_referral (Cohort data)
Referral priority	priority_type (CWT): Grouped as follows: *Urgent referral:* 2 – Urgent or 3 – Two Week Wait	saff_priority (Cohort data)
Treatment date	Derived as date of first record of disease-targeted treatment (see below)	Derived as date of first record of disease-targeted treatment (see below)
Disease-targeted treatment		
Surgery record	Derived by searching HES variables opertn_01 – opertn_24 for surgery codes listed in Table 5; counted the first surgery record up to 30 days before diagnosis date or up to 9 months after diagnosis date	Identified using procedures recorded in mainproc (Cohort data): procedures 1-4 categorised as oesophagectomy; procedures 6-12 categorised as gastrectomy
Surgery date	opdate_01 – opdate_24 (HES) associated with surgery record	date_of_surgery associated with valid mainproc (Cohort data)
SACT (Systemic Anti-Cancer Treatment)	Derived based on any record of anti-cancer treatment in SACT from date of diagnosis up to 9 months after diagnosis date, with primary_diagnosis equal to C15, C16, or C76-80 (Malignant neoplasms of ill-defined, secondary and unspecified sites) (except exclusions in Table 6)	Derived based on the presence of a value in the variable start_date_of_chemotherapy (Cohort data)
SACT date	start_date_of_cycle associated with SACT	start_date_of_chemotherapy (Cohort data)
Radiotherapy treatment	Derived based on any record of radiotherapy in RTDS from date of diagnosis up to 9 months after diagnosis date, with radiotherapydiagnosisicd equal to C15, C16, or C76-80 (Malignant neoplasms of ill-defined, secondary and unspecified sites)	Derived based on the presence of a value in the variable start_date_of_radiotherapy (Cohort data)

Radiotherapy date	apptdate associated with radiotherapy treatment	start_date_of_radiotherapy (Cohort data)
First treatment date	Earliest of surgery date, SACT date, and radiotherapy date	Earliest of surgery date, chemotherapy date, and radiotherapy date
Supportive care for OG cancer		
CNS (Clinical Nurse Specialist) involved	Derived using clinicalnursespecialist (COSD), counting any "Yes" response option as CNS involved when associated with an MDT meeting date (firstmdtmeetingdate in COSD) within 90 days of diagnosis date	Data not provided
Survival		
Vital status	Determined via RCRD Pathway file variable event_type=19 (Patient vital status), which includes vital status and date of vital status	Derived based on the presence of a value in the variable date_of_death (ONS). Length of survival from diagnosis calculated using time between diagnosis_date (Cohort data) and date_of_death (ONS)

Audit inclusion and exclusion criteria

Note: if practices differ between the analysis of English and Welsh data, these have been noted separately

Criteria	Operationalisation in data sources **See variable table for details on each variable**
Inclusion	
Malignant neoplasm of the oesophagus or stomach	Tumour site is one of the OG cancer diagnosis codes listed in Table 1
First diagnosis of primary OG cancer	Only one diagnosis per patient was provided
Histological diagnosis	**For English data:** tumour_morphology (RCRD) has a value between 8001 – 9989 (exclude morphology codes of 8000 as it is generic "neoplasm, malignant") *and/or* morphology_clean (SACT) has a value between 8001 – 9989 and primary_diagnosis is C15 or C16 *and/or* morphology_cosdpath (COSD Pathology) has a value between 8001 – 9989 and sampletakendate and/or samplereceiptdate and/or investigationresultdate is the same as diagnosis date or surgery date **For Welsh data:**

	Records with missing values for morphology_description (Cohort data) or values containing “insufficient” or “no microscopic” were excluded
Epithelial tumour	**For English data:** tumour_morphology or morphology_clean or morphology_cosdpath variables contain one of the epithelial morphology codes specified in Table 3 **For Welsh data:** Records with values of morphology_description (Cohort data) containing the following were excluded: “dysplasia”, “neuroendocrine”, “stromal”, “sarcoma”
Adults	Age at diagnosis >=18
Exclusion	
Non-epithelial tumours	**For English data:** Majority already excluded via the requirement for an epithelial tumour based on morphology codes. Additional exclusion as follows: benchmark_group (SACT) contains treatment indicated for GIST tumours (non-epithelial): imatinib, sunitinib, or regorafenib with primary_diagnosis of C15 or C16 **For Welsh data:** see above inclusion criteria
Neuroendocrine tumours	**For English data:** tumour_morphology or morphology_clean or morphology_cosdpath variables contain one of the neuroendocrine morphology codes specified in Table 4 *and/or* benchmark_group (SACT) contains treatment indicated for neuroendocrine tumours: "CARBOPLATIN + ETOPOSIDE", "CISPLATIN + ETOPOSIDE", "CARBOPLATIN + SUNITINIB", "CISPLATIN + SUNITINIB", "CARBOPLATIN + EVEROLIMUS", "CISPLATIN + EVEROLIMUS" with primary_diagnosis of C15 or C16 **For Welsh data:** see above inclusion criteria
Diagnosis via death certificate only	**For English data:** Using RCRD: final_route = DCO (Death Certificate Only) *and/or* basisofdiagnosis = 0 (Death certificate) *and/or* diagnosisdate = vitalstatusdate (and vital status is death) **For Welsh data:** diagnosis_date (Cohort data) = date_of_death (ONS).

Indicator definitions & construction notes

Indicator	Definition & construction notes
1. Percentage of people with a diagnosis of OG cancer who are diagnosed after an emergency admission	Numerator: Number of people with final_route (RCRD) or source_of_referral (Wales Cohort data) of "Emergency admission" Denominator: Number of people with a primary diagnosis of OG cancer with complete information related to final_route or source_of_referral
2. Percentage of people with a diagnosis of OG cancer who are diagnosed at stage 4 or with unknown stage	Numerator: Number of people with stage (RCRD or Wales Cohort data) of 4 Denominator: Number of people with a primary diagnosis of OG cancer

3. Median time (days) and IQR from urgent suspected cancer GP referral to first treatment for OG cancer	Numerator: Median time (days) from urgent suspected cancer GP referral to first treatment
	
	Denominator: N/A
	
	Construction notes (England):
	• Data cleaning: replaced to missing any referral dates more than 183 days (6 months) before diagnosis date or more than 7 days after diagnosis date
	• In instances of multiple records per patient, executed the following steps to select referral date:
	  ○ Dropped duplicate records in terms of: patient ID, referral date, referral source, priority type, and site ICD10 code
	  ○ In instances of multiple records remaining per patient, prioritised records in the order of:
	  ▪ Containing a relevant tumour site ICD-10 code (C15, C16, or non-site specific C76-C80)
	  ▪ Earliest referral date
	  ▪ Completeness of data on referral source and referral priority type
	  ▪ GP referral source
	  ▪ Urgent priority referral

4. Percentage of people with a diagnosis of OG cancer who were seen by a CNS	Numerator: number of people with CNS involved Denominator: number of people with a primary diagnosis of OG cancer with complete information related to CNS *Note for Wales: information on CNS not available*
5. Percentage of people undergoing curative surgical resection for OG cancer who had	England: not reported due to very low completeness of pathology data in England

Indicator	Definition & construction notes
adequate lymph nodes examined after surgery	**Wales:** Numerator: number of people with at least 15 lymph nodes examined Denominator: number of people with record of curative surgical resection for OG cancer with complete information on number of nodes examined
6. Percentage of people undergoing curative surgical resection for OG cancer who had positive surgical resection margin rates (risk adjusted)	Not reported due to very low completeness of pathology data in England and small volumes of procedures and events (positive margins) when analysed by procedure type (oesophagectomy vs. gastrectomy) in Wales
7. Adjusted 90-day survival rate after curative surgery* 8. Adjusted 1-year survival rates after curative surgery*	**For English data:** Numerator: number of people alive more than 90 days and 1 year after surgery with curative intent Denominator: number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent Construction notes: • Surgery with curative intent defined as any surgery from Table 5, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9) **For Welsh data:** Numerator: number of people alive at more than 90 days and 1 year after surgery with curative intent Denominator: number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent

9. Percentage of people beginning palliative chemotherapy for OG cancer who complete at least 4 treatment cycles*	Numerator: number of people with a record of at least 4 cycles of palliative chemotherapy
	
	Denominator: number of people with a primary diagnosis of OG cancer starting palliative chemotherapy
	
	Construction notes:
	• Cycles of SACT flagged as palliative if benchmark_group (SACT) was any of the following:
	  ○ Immunotherapy: "PEMBROLIZUMAB" or “NIVOLUMAB”
	  ○ "CAPECITABINE + CISPLATIN + TRASTUZUMAB"
	  ○ "CISPLATIN + FLUOROURACIL + TRASTUZUMAB"
	  ○ "FLUOROURACIL + OXALIPLATIN"
	  ○ "CISPLATIN + FLUOROURACIL"
	  ○ "CAPECITABINE + OXALIPLATIN"
	  ○ "CAPECITABINE + CISPLATIN"

Indicator	Definition & construction notes
	○ "CISPLATIN + CAPECITABINE + EPIRUBICIN" ○ "CAPECITABINE + EPIRUBICIN + OXALIPLATIN" *Note: Not reported for Wales*
10. Percentage of people with stage 4 OG cancer starting SACT who die within 30 days of starting treatment*	Numerator: number of people who died within 30 days of starting SACT Denominator: number of people with a primary diagnosis of stage 4 OG cancer who start any SACT, with no record of surgery or curative radiotherapy *Note: Not reported for Wales*

*Note: these indicators were revised since the publication of the healthcare improvement plan

Statistical analyses

Audit period

People diagnosed with OG cancer between 1 April 2021 and 31 March 2023 (2-year period) were included in the audit. For surgical indicators, the period of analysis was 1 April 2020 – 31 March 2023 (3-year period), to ensure there were enough procedures for analysis by patient subgroups.

Organisation-level allocation and analyses

The analyses in the State of the Nation Report focussed on national-level results, with exploration of variation by trust or health board of diagnosis or OG specialist surgical centre, as appropriate for the indicator. Generally, we reported at the level of OG specialist surgical centre for indicators concerned with surgery as nearly all OG resections in England take place at these specialist centres.

The trust of diagnosis was identified using the organisation recorded in the RCRD. OG specialist surgical centres were flagged via the trust codes listed in Table 7. For Wales, the local health board of diagnosis was identified using the organisation codes listed in Table 8.

A minimum of five diagnoses in the audit period were required for reporting at trust or health board level. This was to ensure only trusts providing cancer services were included and also to avoid very small numbers which can lead to unreliable estimates and increase the risk of potential data disclosure.

Analyses of indicators

All analyses were carried out in STATA version 17.

The values of the various process and outcome indicators are typically expressed as proportions and are presented as percentages. Survival rates are presented with 95% confidence intervals (CI) to describe their level of precision.

In descriptive analyses of continuous variables, the distribution of values is described using appropriate statistics (e.g. mean and standard deviation or median and interquartile range). Categorical data items are described using percentages (%). The denominator of these proportions

(presented as percentages) is the number of patients for whom the value of the data item was not missing, unless otherwise stated.

Risk adjustment

Risk-adjusted figures for NHS organisations are presented for 90-day and 1-year survival indicators. The survival rates have been adjusted to take into account differences in the case mix of patients treated at each organisation. Multivariable logistic regression models have been used to estimate the likelihood of survival for each individual who had a record of curative surgical resection for OG cancer (based on their characteristics), and these probabilities have been summed to calculate the predicted number of people surviving for each organisation. The regression models include the following patient characteristics: age group, sex, deprivation (IMD quintile), stage, performance status, tumour site (C15 or C16), RCS Charlson score (calculated using HES-APC or PEDW), and diagnosis year. Data for England and Wales were analysed separately.

Missing values for stage, performance status (for England only), and IMD quintile (for Wales only) were imputed with multiple imputation using chained equations, creating ten data sets and pooling model estimates using Rubin's Rules. The imputation models included all the variables in the analysis models.

Risk adjusted rates are presented only for organisations with at least 10 people with a record of curative surgery during the relevant period.

Reporting of small numbers

We follow the Office for National Statistics policy on the publication of small numbers to minimise the risk of patient identification from these aggregate results.

Given the focus on national-level results in this report, there was not an issue of small number reporting. For results presented at NHS trust or health board level, we suppress cell values when there were less than 25 diagnoses at the trust and/or the denominator was <10.

Reporting of statistical outliers

NOGCA will implement HQIP's formal "outlier process" if needed, which is specified in our Outlier Policy.

Code lists

Table 1. ICD-10 codes used to define OG cancer audit cohort

Code	Description
C15	Malignant neoplasm of oesophagus
C16	Malignant neoplasm of stomach

For details of what is covered by these codes, see: https://icd.who.int/browse10/2019

Table 2. Morphology codes for sub-types of tumours (restricted to two most common sub-types)

Code	Description
Adenocarcinoma	
8005	Malignant tumour, clear cell type
8140	Adenocarcinoma
8141	Scirrhous adenocarcinoma
8143	Superficial spreading adenocarcinoma
8144	Adenocarcinoma, intestinal type
8190	Trabecular adenocarcinoma
8210	Adenocarcinoma in adenomatous polyp
8211	Tubular adenocarcinoma
8213	Serrated adenocarcinoma
8255	Adenocarcinoma with mixed subtypes
8260	Papillary adenocarcinoma, NOS
8261	Adenocarcinoma in villous adenoma
8262	Villous adenocarcinoma
8263	Adenocarcinoma in tubulovillous adenoma
8310	Clear cell adenocarcinoma
8323	Mixed cell adenocarcinoma
8440	Cystadenocarcinoma
8480	Mucinous adenocarcinoma
8481	Mucin-producing adenocarcinoma
8570	Adenocarcinoma with squamous metaplasia
8571	Adenocarcinoma w cartilag. & oss. metaplas.
8572	Adenocarcinoma with spindle cell mataplasia
8573	Adenocarcinoma with apocrine metaplasia
8574	Adenocarcinoma with neuroendocrine differen.
8576	Hepatoid adenocarcinoma
Squamous cell carcinoma	
8033	Pseudosarcomatous carcinoma
8051	Verrucous carcinoma, NOS
8052	Papillary squamous cell carcinoma
8070	Squamous cell carcinoma
8071	Sq. cell carcinoma, keratinizing
8072	Sq. cell carcinoma, lg. cell, non-ker.
8073	Sq. cell carcinoma, sm. cell, non-ker.
8074	Sq. cell carcinoma, spindle cell
8075	Squamous cell carcinoma, adenoid
8076	Sq. cell carcinoma, micro-invasive

Code	Description
8077	Squamous intraepithelial neoplasia
8078	Squamous cell carcinoma with horn formation
8083	Basaloid squamous cell carcinoma
8084	Squamous cell carcinoma, clear cell type

Note: list may not be exhaustive of all adenocarcinoma or squamous cell morphology as list is based on the morphologies present in the audit cohort
Source of morphology descriptions: https://biobank.ndph.ox.ac.uk/ukb/ukb/docs/ICDcancermorph.pdf

Table 3. Morphology codes for identification of epithelial tumours

Code	Description
8005	Malignant tumour, clear cell type
8010	Carcinoma, NOS
8020	Carcinoma, undifferentiated type
8021	Carcinoma, anaplastic type
8032	Spindle cell carcinoma
8033	Pseudosarcomatous carcinoma
8050	Papillary carcinoma
8051	Verrucous carcinoma, NOS
8052	Papillary squamous cell carcinoma
8070	Squamous cell carcinoma
8071	Sq. cell carcinoma, keratinizing
8072	Sq. cell carcinoma, lg. cell, non-ker.
8073	Sq. cell carcinoma, sm. cell, non-ker.
8074	Sq. cell carcinoma, spindle cell
8075	Squamous cell carcinoma, adenoid
8076	Sq. cell carcinoma, micro-invasive
8077	Squamous intraepithelial neoplasia
8078	Squamous cell carcinoma with horn formation
8083	Basaloid squamous cell carcinoma
8084	Squamous cell carcinoma, clear cell type
8140	Adenocarcinoma
8141	Scirrhous adenocarcinoma
8142	Linitis plastica
8143	Superficial spreading adenocarcinoma
8144	Adenocarcinoma, intestinal type
8145	Carcinoma, diffuse type
8190	Trabecular adenocarcinoma
8210	Adenocarcinoma in adenomatous polyp
8211	Tubular adenocarcinoma
8213	Serrated adenocarcinoma
8214	Parietal cell carcinoma
8231	Carcinoma simplex
8255	Adenocarcinoma with mixed subtypes
8260	Papillary adenocarcinoma, NOS
8261	Adenocarcinoma in villous adenoma
8262	Villous adenocarcinoma

Code	Description
8263	Adenocarcinoma in tubulovillous adenoma
8310	Clear cell adenocarcinoma
8323	Mixed cell adenocarcinoma
8430	Mucoepidermoid carcinoma
8440	Cystadenocarcinoma
8480	Mucinous adenocarcinoma
8481	Mucin-producing adenocarcinoma
8490	Signet ring cell carcinoma
8510	Medullary carcinoma
8512	Medullary carcinoma with lymphoid stroma
8560	Adenosquamous carcinoma
8562	Epithelial-myoepithelial carcinoma
8570	Adenocarcinoma with squamous metaplasia
8571	Adenocarcinoma w cartilag. & oss. metaplas.
8572	Adenocarcinoma with spindle cell mataplasia
8573	Adenocarcinoma with apocrine metaplasia
8574	Adenocarcinoma with neuroendocrine differen.
8576	Hepatoid adenocarcinoma
8982	Malignant myoepithelioma

Source of morphology codes: https://biobank.ndph.ox.ac.uk/ukb/ukb/docs/ICDcancermorph.pdf

Table 4. Morphology codes for identification of neuroendocrine tumours

Code	Description
8013	Large cell neuroendocrine carcinoma
8041	Small cell carcinoma, NOS
8042	Oat cell carcinoma
8043	Small cell carcinoma, fusiform cell
8044	Small cell carcinoma, intermediate cell
8045	Combined small cell carcinoma
8150	Islet cell carcinoma
8151	Insulinoma
8152	Glucagonoma
8153	Gastrinoma
8154	Mixed islet cell & exocrine adenocarcinoma
8155	Vipoma
8156	Somatostatinoma
8157	Enteroglucagonoma
8158	ACTH-producing tumor
8240	Carcinoid tumour
8241	Enterochromaffin cell carcinoid
8242	Enterochromaffin-like cell tumour
8243	Goblet cell carcinoid
8244	Composite carcinoid
8245	Adenocarcinoid tumour
8246	Neuroendocrine carcinoma
8247	Merkel cell carcinoma

Code	Description
8249	Atypical carcinoid tumour
9091	Strumal carcinoid

Source of morphology descriptions: https://biobank.ndph.ox.ac.uk/ukb/ukb/docs/ICDcancermorph.pdf
Reference publication on neuroendocrine tumour morphology codes:
https://www.nature.com/articles/s41416-019-0606-3

Table 5. OPCS-4 codes used to identify major oesophageal and gastric resections

OPCS-4 code	Description
Oesophageal cancer	
G01.1	Oesophagogastrectomy and anastomosis of oesophagus to stomach
G01.8	Excision of oesophagus and stomach: Other specified
G01.9	Excision of oesophagus and stomach: Unspecified
G02.1	Total oesophagectomy and anastomosis of pharynx to stomach
G02.2	Total oesophagectomy and interposition of microvascularly attached jejunum
G02.3	Total oesophagectomy and interposition of jejunum NEC
G02.4	Total oesophagectomy and interposition of microvascularly attached colon
G02.5	Total oesophagectomy and interposition of colon NEC
G02.8	Total excision of oesophagus: Other specified
G02.9	Total excision of oesophagus: Unspecified
G03.1	Partial oesophagectomy and end to end anastomosis of oesophagus
G03.2	Partial oesophagectomy and interposition of microvascularly attached jejunum
G03.3	Partial oesophagectomy and anastomosis of oesophagus to transposed jejunum
G03.4	Partial oesophagectomy and anastomosis of oesophagus to jejunum NEC
G03.5	Partial oesophagectomy and interposition of microvascularly attached colon
G03.6	Partial oesophagectomy and interposition of colon NEC
G03.8	Partial excision of oesophagus: Other specified
G03.9	Partial excision of oesophagus: Unspecified
Gastric cancer	
G01.2	Oesophagogastrectomy and anastomosis of oesophagus to transposed jejunum
G01.3	Oesophagogastrectomy and anastomosis of oesophagus to jejunum NEC
G27.1	Total gastrectomy and excision of surrounding tissue
G27.2	Total gastrectomy and anastomosis of oesophagus to duodenum
G27.3	Total gastrectomy and interposition of jejunum
G27.4	Total gastrectomy and anastomosis of oesophagus to transposed jejunum
G27.5	Total gastrectomy and anastomosis of oesophagus to jejunum NEC
G27.8	Total excision of stomach: Other specified
G27.9	Total excision of stomach: Unspecified
G28.1	Partial gastrectomy and anastomosis of stomach to duodenum
G28.2	Partial gastrectomy and anastomosis of stomach to transposed jejunum
G28.3	Partial gastrectomy and anastomosis of stomach to jejunum NEC
G28.8	Partial excision of stomach: Other specified
G28.9	Partial excision of stomach: Unspecified

Source of OPCS-4 codes: https://classbrowser.nhs.uk/#/book/OPCS-4.10/

Table 6. Excluded regimens in Systemic Anti-Cancer Therapy (SACT) dataset

Regimens excluded from SACT analyses
Benchmark_group= “NOT CHEMO” & drug_group=”ZOLEDRONIC ACID”
Benchmark_group= “NOT CHEMO” & drug_group=”DEXAMETHASONE” or drug_group=”HYDROCORTISONE”

Table 7. Trust codes for OG surgical specialist centres

Trust code	Trust name
R0D	University Hospitals Dorset NHS Foundation Trust
RA2	Royal Surrey County Hospital NHS Foundation Trust
RA7	University Hospitals Bristol and Weston NHS Foundation Trust
RAE	Bradford Teaching Hospitals NHS Foundation Trust
RAJ	Mid and South Essex NHS Foundation Trust
REM	Liverpool University Hospitals NHS Foundation
RF4	Barking, Havering and Redbridge University Hospitals NHS Trust
RGT	Cambridge University Hospitals NHS Foundation Trust
RHM	University Hospital Southampton NHS Foundation Trust
RHQ	Sheffield Teaching Hospitals NHS Foundation Trust
RHU	Portsmouth Hospitals University NHS Trust
RJ1	Guy's and St Thomas' NHS Foundation Trust
RJE	University Hospitals of North Midlands NHS Trust
RK9	University Hospitals Plymouth NHS Trust
RKB	University Hospitals Coventry and Warwickshire NHS Trust
RM1	Norfolk and Norwich University Hospitals NHS Foundation Trust
RM3	Northern Care Alliance NHS Foundation Trust
RPY	The Royal Marsden NHS Foundation Trust
RR8	Leeds Teaching Hospitals NHS Trust
RRK	University Hospitals Birmingham NHS Foundation Trust
RRV	University College London Hospitals NHS Foundation Trust
RTD	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
RTE	Gloucestershire Hospitals NHS Foundation Trust
RTG	University Hospitals of Derby And Burton NHS Foundation Trust
RTH	Oxford University Hospitals NHS Foundation Trust
RTR	South Tees Hospitals NHS Foundation Trust
RWA	Hull University teaching Hospitals NHS Trust
RWE	University Hospitals of Leicester NHS Trust
RX1	Nottingham University Hospitals NHS Trust
RXN	Lancashire Teaching Hospitals NHS Foundation Trust
RYJ	Imperial College Healthcare NHS Trust
RYR	University Hospitals Sussex NHS Foundation Trust

Table 8. Organisation codes for Wales Local Health Boards

Organisation code	Local Health Board	Specialist surgical centre
7A1	Betsi Cadwaladr University Health Board	YES
7A2	Hywel Dda University Health Board	NO

Organisation code	Local Health Board	Specialist surgical centre
7A3	Swansea Bay University Health Board	NO
7A4	Cardiff and Vale University Health Board	YES
7A5	Cwm Taf Morgannwg University Health Board	NO
7A6	Aneurin Bevan University Health Board	NO