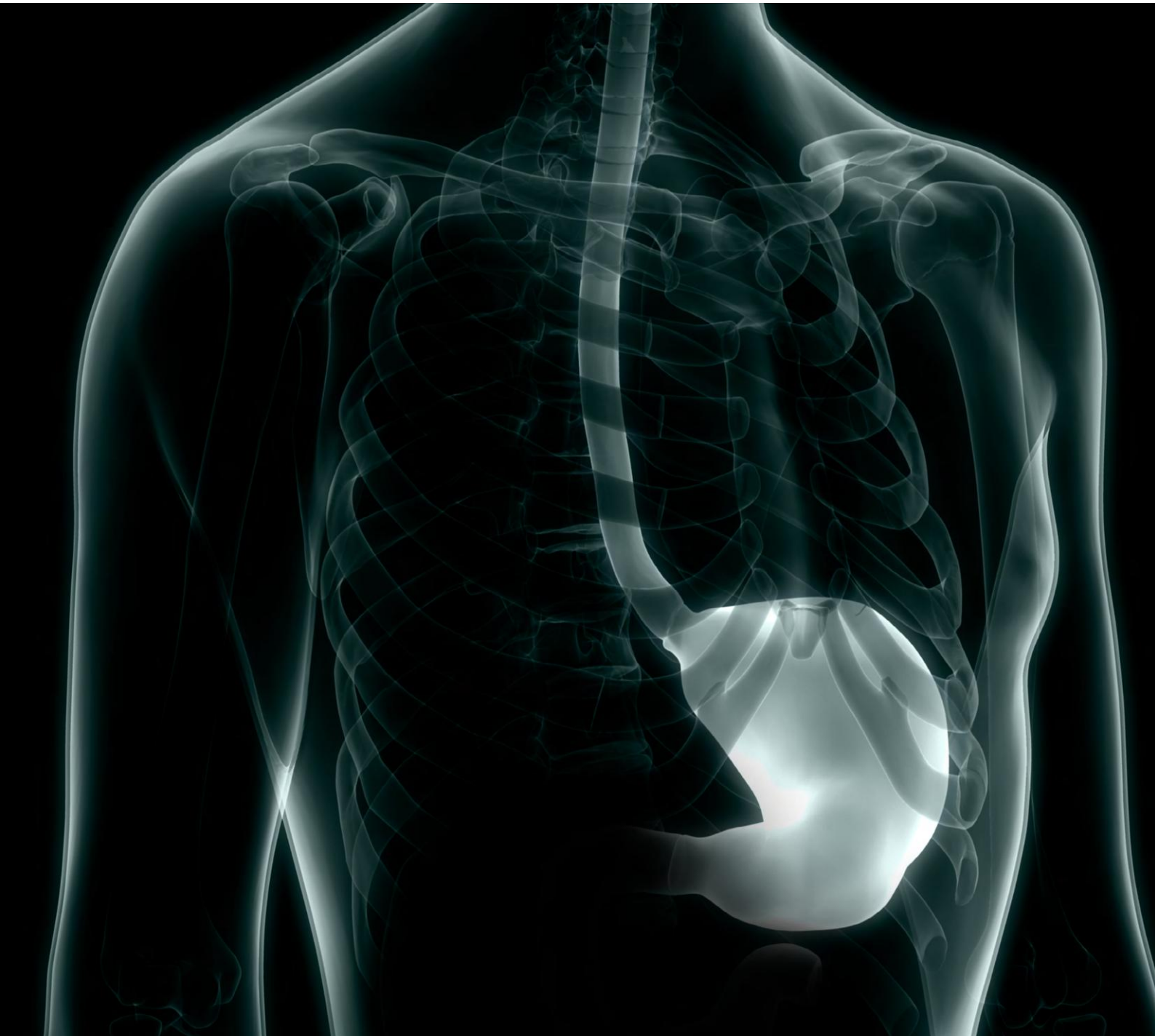
NOGCA
National Oesophago-Gastric Cancer Audit

NATCAN
National Cancer Audit Collaborating Centre

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

An audit of care received by people diagnosed with oesophageal and gastric cancer between 1 January 2023 and 31 December 2024 in England and Wales.

Published September 2026



NATCAN
National Cancer Audit
Collaborating Centre

Citation for this document:
National Oesophago-Gastric Cancer Audit (NOGCA) State of the Nation Report 2026. London: National Cancer Audit Collaborating Centre, Royal College of Surgeons of England, 2026.

This document was prepared by members of the NOGCA project team:
Tom Crosby, Clinical Lead, Consultant Clinical Oncologist
James Gossage, Clinical Lead, Consultant Oesophago-Gastric Surgeon
Betsan Thomas, Deputy Clinical Lead, Consultant Clinical Oncologist
Nigel Trudgill, Clinical Lead, Consultant Gastroenterologist
David Cromwell, Senior Methodologist
Karen Darley, Senior Project Manager
Sarah Epton, Research Fellow
Amanda McDonell, Data Scientist
Olivia O'Connor, Clinical Fellow
Min Hae Park, Methodologist

With review and input from:
NOGCA Clinical Reference Group
NATCAN Executive Team

Royal College of Surgeons of England

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. Registered Charity no: 212808.

HQIP Healthcare Quality Improvement Partnership

The National Cancer Audit Collaborating Centre (NATCAN) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and funded by NHS England and the Welsh Government as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). NATCAN delivers national audits in bowel, breast (primary and metastatic), kidney, lung, non-Hodgkin lymphoma, oesophago-gastric, ovarian, pancreatic and prostate cancers.

AUGIS Association of Upper Gastrointestinal Surgery of Great Britain and Ireland

The Association of Upper Gastrointestinal Surgery of Great Britain and Ireland is the specialty society that represents upper gastrointestinal surgeons. It is one of the key partners leading the Audit. Registered Charity no: 1093090.

bsg British Society of Gastroenterology

British Society of Gastroenterology is the specialty society of gastroenterologists. It is one of the key partners leading the Audit. Registered Charity no: 1149074.

The Royal College of Radiologists

Royal College of Radiologists is the professional body for clinical radiologists and clinical oncologists. It is one of the key partners leading the Audit. Registered Charity no: 211540.

NDRS National Disease Registration Service

This work uses data that has been provided by patients and collected by the NHS as part of their care and support. For patients diagnosed in England, the data are collated, maintained and quality assured by the National Disease Registration Service (NDRS), which is part of NHS England. Access to the data was facilitated by the NHS England Data Access Request Service.

NHS Wales recently implemented Cancer Dataset Forms with the latest implementation date being January 2025. These have been designed to improve the data capture and reporting capabilities of NHS Wales. This implementation has impacted the data quality within NHS Wales. NHS Wales has committed to continue to submit audit data annually until data submissions are sourced exclusively from the new cancer informatics solution. This will be from 2027 onwards that NHS Wales will be able to supply quarterly data using this new integrated, and more accessible digital platform.

Contents

1. Introduction 1
2. Sources of Data 1
3. Inclusion and Exclusion Criteria 2
4. Key Data Items 4
5. Indicator Definitions 9
   - 5.1 Pathway Indicator 1: Diagnosis after an emergency admission 9
   - 5.2 Pathway Indicator 2: Diagnosis at stage 4 9
   - 5.3 Performance Indicator 1: Time to treatment 10
   - 5.4 Performance Indicator 2: Clinical nurse specialist (CNS) involvement 10
   - 5.5 Performance Indicator 3: Curative treatment rates 11
   - 5.6 Performance Indicator 4: 90-day survival rate after curative surgery 11
   - 5.7 Performance Indicator 5: Length of stay greater than 15 days post-surgery 12
   - 5.8 Performance Indicator 6: 30-day readmission post-surgery 13
   - 5.9 Performance Indicator 7: Palliative systemic anti-cancer therapy (SACT) completion 14
   - 5.10 Performance Indicator 8: Mortality after starting systemic anti-cancer therapy (SACT) 14
   - 5.11 Survival indicator: One- and three-year survival 15
6. NHS organisations 16
7. Statistical Analysis 17
   - 7.1 Small number suppression 17
   - 7.2 Risk-adjustment of indicators 17
   - 7.3 Handling of missing data 18
   - 7.4 Calculation of control limits 18
8. Outlier Process 18

Appendix 1: Routine data sources 19
Appendix 2: Charlson Comorbidity Index 20
Appendix 3: Morphology codes for sub-types of oesophageal tumours 21
Appendix 4: Morphology codes of epithelial tumours 22
Appendix 5: Morphology codes of neuroendocrine tumours 23
Appendix 6: OPCS-4 codes used to flag diagnostic endoscopy 24
Appendix 7: OPCS-4 codes for EMR/ESD 25
Appendix 8: OPCS-4 codes for major oesophageal or gastric resections 26
Appendix 9: OPCS-4 codes for surgery approach 27
Appendix 10: OPCS-4 codes for SACT administration 28
Appendix 11: Palliative SACT regimens 28
Appendix 12: World Health Organisation Performance Status 29
Appendix 13: Organisational codes 30

1. Introduction

This document provides supporting material to the September 2026 State of the Nation (SotN) Report for the National Oesophago-Gastric Cancer Audit (NOGCA). The document describes the data used in the report with details on sources of data, criteria for inclusion and how data completeness, patient characteristics and performance indicators are derived and reported.

2. Sources of Data

The audit uses information from routine national health care datasets in England and Wales. These datasets capture details on the diagnosis, management, treatment and outcome of every patient diagnosed with cancer in the NHS in England and Wales.

For England, the audit cohort is based on the Rapid Cancer Registration Dataset (RCRD) which is curated by the National Disease Registration Service (NDRS). The information held in the RCRD is compiled from a variety of sources including the Cancer Outcomes and Services Dataset (COSD), Hospital Episode Statistics admitted patient care (HES APC) records, the Systemic Anti-Cancer Therapy dataset (SACT), RTDS and data submitted by pathology laboratories.

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. More information on the cancer registration process can be found here and the timeliness of the RCRD and NCRD here.

The audit also receives linked information from several other routine national health care datasets: see Appendix 1: Routine data sources for more detail on the data sources analysed as part of the audit.

The English data received by the National Cancer Audit Collaborating Centre (NATCAN) was the basis of the audit cohort of people with OG cancer diagnosed up to 31st December 2024.

For Wales, the audit was provided with patient-level information by the Wales Cancer Network (WCN) for people diagnosed with oesophageal or gastric cancer between 1 January 2023 and 31 December 2024. Welsh cancer registration data is captured through a national system, Cancer Information System for Wales (CaNISC) and the new Welsh Clinical Portal called the Clinical Dataset Form (CDF). The audit also received datasets that linked to these registration records. Records on inpatient and day case activity was supplied from the Patient Episode Database for Wales (PEDW), and information on systemic anti-cancer therapy and radiotherapy were obtained from the CaNISC and CDF cancer datasets. Radiotherapy information was additionally supplemented using Welsh radiotherapy (RTH) data.

Data on death registrations was supplied from the Office for National Statistics (ONS) for Welsh patients. Data for England and Wales were managed and analysed separately.

3. Inclusion and Exclusion Criteria

The data submitted by NDRS and WCN was reviewed and processed to ensure the audit analysis contained only eligible participants. Tables 3.1 and 3.2 explains the process of defining the cohort used in the audit.

People were included for analysis within the SotN Report if they met the following inclusion and not the exclusion criteria:

Table 3.1: Audit Inclusion Criteria

Inclusion Criteria	**Details**
Type of cancer	Malignant neoplasm of the oesophagus or stomach, identified via ICD-10 codes C15 or C16
First diagnosis of primary OG cancer	**For English data:** Earliest diagnosis date in the extract of data received (from 1 January 2018 – 31 October 2024) **For Welsh data:** Not applicable; dataset contained information on only one diagnosis per person
Adults	Age >=18
Valid Diagnosis Date	First diagnosis of primary OG cancer between 1 January 2023 and 31 December 2024
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 from CaNISC), morphologydiagnosis (Cohort data from CDF) 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 Appendix 4: Morphology codes of epithelial tumours **For Welsh data:** morphology_description (CaNISC) or morphologydiagnosis (CDF) variable contains description of epithelial tumour type

Table 3.2: Audit Exclusion Criteria

Exclusion Criteria	**Details**
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 Appendix 5: Morphology codes of neuroendocrine tumours and/or benchmark_group (SACT) contains treatment indicated for neuroendocrine tumours: "CARBOPLATIN + ETOPOSIDE", "CISPLATIN + ETOPOSIDE", " SUNITINIB", " EVEROLIMUS" with primary_diagnosis of C15 or C16 **For Welsh data:** morphology_description (CaNISC) or morphologydiagnosis (CDF) variable contains description of neuroendocrine tumour
Reported by death certificate only or date of diagnosis corresponds to date of death	**For English data:** Using RCRD: final_route = DCO (Death Certificate Only) and/or basisofdiagnosis = 0 (Death certificate) and/or diagnosisdatebest = deathdatebest (and vital status is death) **For Welsh data:** DIAGNOSIS_DATE (Cohort data from CaNISC) or dateofprimarydiagnosis (Cohort data from CDF) = date of death
Neither diagnosed nor treated within the constituent country of interest	**For English data:** Organisation of diagnosis was not an English NHS trust (code starting with “R”) No record of major resection in England For Welsh data: Organisation of diagnosis was not a Welsh health board (code starting with “7”)

4. Key Data Items

Details of the variables and datasets used to compile the data completeness are shown below in Table 4.1

Table 4.1: Data Completeness Variables				
Data Item	**Source**			
	England		**Wales**	
	Data field	**Dataset**	**Data field**	**Dataset**
Stage at diagnosis	Stage Derivations: Stage 0 recoded as stage 1; Missing stage recorded as stage 4 if tumour_morphology ended with behaviour code of 6 (metastatic); stage recoded as stage 4 if basisofdiagnosis was equal to 6 or 7.2 (both "histology of a metastasis")	RCRD	Derived usingvariables: t_stage_final_pretreatment, n_stage_final_pretreatment m_stage_final_pretreatment t_category_finalpretreatment n_category_finalpretreatment m_category_finalpretreatment stage_grouping_finalpretreatmentto generate overall stage using the AJCC (American Joint Committee on Cancer staging) clinical stage coding for oesophageal and stomach cancer version 8 [1].	CaNISC, CDF
Performance status at diagnosis	tumour_performancestatus	RCRD	performance_status performancestatus	CaNISC, CDF
Clinical Nurse Specialist (CNS) involved	Derived using clinicalnursespecialist, counting any "Yes" response option as CNS involved when associated with an MDT meeting date (firstmdtmeetingdate) within 90 days of diagnosis date	Derived by NDRS from COSD	hasseencancernurse specialist	CDF only

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

Details of the variables and datasets used to compile the patient and tumour characteristics are shown below in Table 4.2.

Table 4.2: Patient and Tumour Characteristics Variables

Data Item	Source			
	England		Wales	
	Data field	Dataset	Data field	Dataset
Age at diagnosis	Calculated as diagnosisdate minus date of birth, with date of birth derived from birthmonth and birthyear, with the day set to 1st of the month	RCRD	ageatdiagnosis	CANISC, CDF
Ethnicity	ethniccategory Grouped as: White = 0, A, B, or C Mixed = D, E, F, or G Asian or Asian British = H, J, K, L, or R Black or Black British = M, N, or P Other ethnic group = S or 8 Missing = X or Z	RCRD	Ethnicgroupcategory patientethnicity	PEDW, CDF
Index of multiple deprivation	quintile_2019	RCRD	Deprivationquintile	LSOA
Performance status at diagnosis	tumour_performancestatus	RCRD	performance_status performancestatus	CaNISC, CDF
Sex	gender	RCRD	gender	CaNISC, CDF
Stage at diagnosis	Stage Derivations: Stage 0 recoded as stage 1; Missing stage recorded as stage 4 if tumour_morphology ended with behaviour code of 6 (metastatic) and/or if basisofdiagnosis was "histology of a metastasis"	RCRD	Derived using variables: t_stage_final_pretreatment, n_stage_final_pretreatment m_stage_final_pretreatment t_category_finalpretreatment n_category_finalpretreatment m_category_finalpretreatment stage_grouping_finalpretreatment to generate overall stage using the AJCC (American Joint Committee on Cancer staging) clinical stage coding for oesophageal and stomach cancer version 8 [2].	CaNISC, CDF
Tumour site and sub-type	tumour_site See Appendix 3: Morphology codes for sub-types of oesophageal tumours for morphology codes for subtypes	RCRD	tumour_site diagnosisicd10 morphology_description morphologydiagnosis	CaNISC, CDF

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

Details of the variables and datasets used to construct performance indicators are show below in Table 4.3.

Table 4.3: Indicator Construction Variables				
Data Item	**Source**			
	England		**Wales**	
	Data field	**Dataset**	**Data field**	**Dataset**
Organisation of diagnosis	diagnosis_trust When diagnosis_trust was a non-NHS or non-cancer diagnosing NHS trust or missing, derived using trust of diagnostic endoscopy where available	RCRD	organisation_code primarydiagnosissitehospitalcode	CaNISC, CDF
Diagnosis date	diagnosisdate When diagnosisdate=surgery date, changed diagnosisdate to diagnostic endoscopy date	RCRD	diagnosis_date dateofprimarydiagnosis	CaNISC, CDF
Route to diagnosis	final_route	RCRD	source_of_referral sourceofreferral	CaNISC, CDF
Diagnostic endoscopy record	Derived by searching variables opertn_01 – opertn_24 for non-therapeutic endoscopy codes listed in Appendix 6: OPCS-4 codes used to flag diagnostic endoscopy; counted the first endoscopy record up to 30 days before diagnosis date	HES-APC HES-OP	Derived by searching variables operation01 to operation12 for non-therapeutic endoscopy codes listed in Appendix 6: OPCS-4 codes used to flag diagnostic endoscopy; counted the first endoscopy record up to 30 days before diagnosis date	PEDW
Diagnostic endoscopy date	Earliest of opdate_01 – opdate_24 (HES-APC) or apptdate (HES-OP) associated with diagnostic endoscopy record	HES-APC HES-OP	operation01datestyle to operation12datestyle associated with diagnostic endoscopy record	PEDW
Date of disease-targeted treatment	Derived as date of first record of disease-targeted treatment (EMR/ESD, surgery, chemotherapy, or radiotherapy)	Various – see below	Derived as date of first record of disease-targeted treatment (EMR/ESD, surgery, chemotherapy, or radiotherapy)	Various – see below
EMR/ESD record	Derived by searching variables opertn_01 – opertn_24 for EMR/ESD codes listed in Appendix 7: OPCS-4 codes for EMR/ESD; counted the first record up to 30 days before diagnosis date or up to 9 months after diagnosis date	HES-APC HES-OP	Derived by searching variables operation01 to operation12 for EMR/ESD codes listed in Appendix 7: OPCS-4 codes for EMR/ESD; counted the first record up to 30 days before diagnosis date or up to 9 months after diagnosis date	PEDW
EMR/ESD date	Earliest of opdate_01 – opdate_24 (HES-APC) or apptdate (HES-OP) associated with EMR/ESD record	HES-APC HES-OP	operation01datestyle to operation12datestyle associated with EMR/ESD record	PEDW
Surgery record	Derived by searching 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	HES-APC	Identified using procedures recorded in primary_procedure or firstsurgery_primarysurgicalproc; included surgical resections that took place up to 12 months after diagnosis date	CaNISC, CDF

	up to 12 months after diagnosis date			
Surgery date	opdate_01 – opdate_24 associated with surgery record	HES-APC	date_of_surgery or firstsurgery_dateofsurgery associated with valid primary_procedure or firstsurgery_primarysurgicalproc	CaNISC, CDF
Surgery discharge date	Derived as the latest discharge date (disdate) corresponding to the admission date (admidate) for the episode in which surgery occurred; for people with no discharge date, set discharge date to be the maximum episode end date (epiend) Replaced discharge date with vitalstatusdate when vitalstatusdate was < discharge date	HES-APC	Derived as the latest discharge date (discharge_date or firstsurgery_dischargedate) or death in hospital after surgery date (death_in_hospital or deathinhospital) corresponding to the surgery date (date_of_surgery or firstsurgery_dateofsurgery)	CaNISC, CDF
Overnight readmission	Derived as the latest discharge date (disdate) corresponding to an admission date (admidate) following surgery; for people with no discharge date, set discharge date to be the maximum episode end date (epiend) Flag as overnight readmission when discharge date minus admission date is >0	HES-APC	Derived as the first admission date (admidate) in PEDW occurring after discharge/death from the surgical admission (date_disdeath) and within 30 days. Overnight readmission was flagged where the duration of the readmission episode was >0 days.	PEDW
SACT (Systemic Anti-Cancer Treatment) record	Derived based on any record of anti-cancer treatment up to 9 months after diagnosis date, with primary_diagnosis of C15 or C16 (SACT); for time to treatment indicators, also included any instance of chemotherapy administration codes (see Appendix 10: OPCS-4 codes for SACT administration) in opertn_1-opertn_24 (HES)	SACT HES-APC HES-OP	Derived based on the presence of a value in the variable start_date_of_chemotherapy or neoadjuvantchemotherapystart date or adjuvantchemotherapystartdate, or presence of OPCS-4 codes for chemotherapy in variables operation01 to operation12 in PEDW.	CaNISC, CDF / PEDW
SACT date	start_date_of_cycle (SACT) or opdate_01 – opdate_24 (HES-APC), or apptdate (HES-OP) associated with SACT treatment record associated with SACT record	SACT HES-APC HES-OP	start_date_of_chemotherapy, neoadjuvantchemotherapystart date, adjuvantcehmotherapystartdate; operation01datestyle to operation12datestyle associated with chemotherapy record	CaNISC, CDF / PEDW
Neoadjuvant chemotherapy	First record of any treatment after diagnosis was SACT and benchmark_group =	SACT	N/A	

	"DOCETAXEL + FLUOROURACIL + OXALIPLATIN"			
Radiotherapy record	Derived based on any record of radiotherapy (RT) up to 9 months after diagnosis date, with radiotherapydiagnosisicd of C15 or C16.	RTDS	Derived based on the presence of a value in the variable start_date_of_radiotherapy, radiotherapystartdate	CaNISC, CDF, RTH
Radiotherapy date	Apptdate associated with first date of an RT prescription	RTDS	start_date_of_radiotherapy, radiotherapystartdate	CaNISC, CDF, RTH
First disease-targeted treatment date	Earliest of surgery date, SACT date, radiotherapy date, and EMR/ESD date	Derived	Earliest of surgery date, SACT date, radiotherapy date, and EMR/ESD date	Derived
Curative treatment	Any of the following treatments: • EMR/ESD • Surgery, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9) • Neoadjuvant chemotherapy (with or without subsequent surgery) • Neoadjuvant radiotherapy, following dose in fractions: 41.4 in 23 • Radiotherapy, following dose in fractions: 50 in 25; 50.4 in 28; 60 in 30; 50 in 15/16; 50-55 in 20; 45-52.5 in 15/16		Derived as any record of curative-intent treatment, including EMR/ESD, OG resection surgery not recorded as palliative, chemotherapy/SACT, or curative-intent radiotherapy. EMR/ESD and surgical resection procedures were identified from CDF/CaNISC and supplemented using PEDW procedure codes. Chemotherapy/SACT date was taken from the registry where available and supplemented using PEDW SACT records.	CaNISC, CDF / PEDW
Clinical Nurse Specialist (CNS) involved	Derived using clinicalnursespecialist, counting any “Yes” response option as CNS involved when associated with an MDT meeting date (firstmdtmeetingdate) within 90 days of diagnosis date	Derived by NDRS from COSD	hasseencancernursespecialist	CDF only
Vital status	Pathway file variable event_type=19 (Patient vital status), which includes vital status and date of vital status	RCRD	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 (CaNISC), dateofprimarydiagnosis (CDF) and date_of_death (ONS)	CaNISC; ONS

5. Indicator Definitions

The audit reports key indicators to monitor progress against its healthcare improvement goals. Where appropriate, these indicators align with national guidelines and standards. Definitions of how the indicators included in the SotN report were derived from data for England and Wales are described below.

Some indicators are further focused on subgroups of patients as defined by sex and stage of the disease, as these factors are important determinants of whether particular treatments are suitable for patients.

5.1 Pathway Indicator 1: Diagnosis after an emergency admission

Percentage of people with a diagnosis of OG cancer who are diagnosed after an emergency admission.

Table 5.1: Percentage of people with a diagnosis of OG cancer who are diagnosed after an emergency admission

	England	**Wales**
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Number of people diagnosed following an emergency admission	Number of people with a route to diagnosis *(final_route)* of "emergency admission"	Number of people with a route to diagnosis *(source_of_referral or sourceofreferral)* of "emergency admission" or "A&E attendance"
Denominator: Number of people with a primary diagnosis of OG cancer with complete information related to route to diagnosis	Number of people with a primary diagnosis of OG cancer with complete information related to route to diagnosis	Number of people with a primary diagnosis of OG cancer with complete information related to route to diagnosis
Construction notes:		
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	No
Outlier reporting:	No	No

5.2 Pathway Indicator 2: Diagnosis at stage 4

Percentage of people with a diagnosis of OG cancer who are diagnosed at stage 4.

Table 5.2: Percentage of people with a diagnosis of OG cancer who are diagnosed at stage 4 or with unknown stage

	England	**Wales**
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Number of people who have stage 4 disease at diagnosis	Number of people diagnosed with stage 4 cancer	Number of people diagnosed with stage 4 cancer
Denominator: Number of people with a primary diagnosis of OG cancer, with complete information related to stage	Number of people with a primary diagnosis of OG cancer, with complete information related to stage	Number of people with a primary diagnosis of OG cancer, with complete information related to stage
Construction notes:	N/A	N/A
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	No
Outlier reporting:	No	No

5.3 Performance Indicator 1: Time to treatment

Median time (days) and IQR from diagnostic endoscopy to first disease-targeted treatment for OG cancer.

Table 5.3: Median time (days) and IQR from diagnostic endoscopy to first disease-targeted treatment for OG cancer		
	England	**Wales**
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Median time from diagnostic endoscopy to first disease-targeted treatment	Median time (days) from diagnostic endoscopy to first disease-targeted treatment	Median time (days) from diagnostic endoscopy to first disease-targeted treatment
Denominator:	N/A	N/A
Construction notes:	Calculate median and IQR	Calculate median and IQR
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	None
Risk adjusted:	No	No
Outlier reporting:	No	No

5.4 Performance Indicator 2: Clinical nurse specialist (CNS) involvement

Percentage of people with a diagnosis of OG cancer who were seen by a CNS.

Table 5.4: Percentage of people with a diagnosis of OG cancer who are seen by a CNS		
	England	**Wales**
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Number of people with CNS involved	Number of people with CNS involved	Number of people with CNS involved
Denominator: Number of people with a primary diagnosis of OG cancer with complete information related to CNS	Number of people with a primary diagnosis of OG cancer with complete information related to CNS	Number of people with a primary diagnosis of OG cancer with complete information related to CNS (only available from CDF dataset)
Construction notes:		N/A
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	None	N/A
Risk adjusted:	No	N/A
Outlier reporting:	No	N/A

5.5 Performance Indicator 3: Curative treatment rates

Percentage of people who initiated potentially curative treatment (stage 1-3).

Table 5.5: Percentage of people who initiated potentially curative treatment (stage 1-3)		
	England	**Wales**
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Number of people receiving curative treatment	Number of people receiving curative treatment	Number of people receiving curative treatment
Denominator: Number of people with a primary diagnosis of stage 1-3 OG cancer	Number of people with a primary diagnosis of stage 1-3 OG cancer	Number of people with a primary diagnosis of stage 1-3 OG cancer
Construction notes:		
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	Performance status 0-1	Performance status 0-1
Risk adjusted:	No	No
Outlier reporting:	No	No

5.6 Performance Indicator 4: 90-day survival rate after curative surgery

Adjusted 90-day survival after curative surgery.

Table 5.6: 90-day survival rate after curative surgery		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2024	1/1/2022 to 31/12/2024
Numerator: Number of people alive 90 days after surgery	Number of people alive more than 90 days after surgery with curative intent	Number of people alive more than 90 days after surgery with curative intent
Denominator: Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent at an OG surgical centre	Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent at an OG surgical centre	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 Appendix 8: OPCS-4 codes for major oesophageal or gastric resections, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9)	Surgery with curative intent defined as any surgery from Appendix 8: OPCS-4 codes for major oesophageal or gastric resections, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9)
Country reporting:	England & Wales separately	
Organisational Reporting level:	Specialist OG cancer surgical trust (trust of surgery)	National level (unable to reliably allocate people to surgical centres).
Subgroup Reporting:	Surgery type (oesophagectomy vs. gastrectomy)	Surgery type (oesophagectomy vs. gastrectomy)
Risk adjusted:	Yes: Age at diagnosis, sex, index of multiple deprivation, stage at diagnosis, performance status, tumour site, Charlson comorbidity index, diagnosis year	No
Outlier reporting:	Yes	No – see note under organisational reporting level

5.7 Performance Indicator 5: Length of stay greater than 15 days post-surgery

Percentage of people with length of stay >15 days following curative surgery.

Table 5.7: Percentage of people with length of stay >15 days following curative surgery		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2024	1/1/2022 to 31/12/2024
Numerator: Number of people staying longer than 15 days in hospital after surgery	Number of people staying longer than 15 days in hospital after surgery	Number of people staying longer than 15 days in hospital after surgery
Denominator: Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent at an OG surgical centre	Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent at an OG surgical centre	Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent
Construction notes:	Length of stay calculated in days as surgery discharge date minus surgery date Surgery with curative intent defined as any surgery from Appendix 8: OPCS-4 codes for major oesophageal or gastric resections, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9)	Length of stay calculated in days as surgery discharge date minus surgery date Surgery with curative intent defined as any surgery from Appendix 8: OPCS-4 codes for major oesophageal or gastric resections, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9)
Country reporting:	England & Wales separately	
Organisational Reporting level:	Specialist OG cancer surgical trust (trust of surgery)	National level (unable to reliably allocate people to surgical centres).
Subgroup Reporting:	Surgery type (oesophagectomy vs. gastrectomy)	Surgery type (oesophagectomy vs. gastrectomy)
Risk adjusted:	Yes: Age at diagnosis, sex, index of multiple deprivation, stage at diagnosis, performance status, tumour site, Charlson comorbidity index, diagnosis year	No
Outlier reporting:	No	No

5.8 Performance Indicator 6: 30-day readmission post-surgery

Percentage of people readmitted to hospital within 30 days of discharge following curative surgery.

Table 5.8: Percentage of people readmitted to hospital within 30 days of discharge following curative surgery		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2024	1/1/2022 to 31/12/2024
Numerator: Number of people readmitted overnight within 30 days of discharge following surgery	Number of people readmitted overnight within 30 days of discharge following surgery	Number of people readmitted overnight within 30 days of discharge following surgery
Denominator: Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent at an OG surgical centre	Number of people with a primary diagnosis of OG cancer undergoing surgery with curative intent at an OG surgical centre	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 Appendix 8: OPCS-4 codes for major oesophageal or gastric resections, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9)	Surgery with curative intent defined as any surgery from Appendix 8: OPCS-4 codes for major oesophageal or gastric resections, excluding people diagnosed with stage 4 disease undergoing partial gastrectomy (G28.1, G28.2, G28.3, G28.8, G28.9)
Country reporting:	England & Wales separately	
Organisational Reporting level:	Specialist OG cancer surgical trust (trust of surgery)	National level (unable to reliably allocate people to surgical centres).
Subgroup Reporting:	Surgery type (oesophagectomy vs. gastrectomy)	Surgery type (oesophagectomy vs. gastrectomy)
Risk adjusted:	Yes: Age at diagnosis, sex, index of multiple deprivation, stage at diagnosis, performance status, tumour site, Charlson comorbidity index, diagnosis year	No
Outlier reporting:	No	No

5.9 Performance Indicator 7: Palliative systemic anti-cancer therapy (SACT) completion

Percentage of people beginning palliative systemic anti-cancer therapy (SACT) for OG cancer who complete at least four cycles of treatment.

Table 5.9: Percentage of people beginning palliative systemic anti-cancer therapy (SACT) completing at least 4 treatment cycles

	England	Wales
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Number of people with a record of at least 4 cycles of palliative chemotherapy	Number of people with a record of at least 4 cycles of palliative chemotherapy	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 as first treatment within 9 months of diagnosis	Number of people with a primary diagnosis of OG cancer starting palliative chemotherapy as first treatment within 9 months of diagnosis	Number of people with a primary diagnosis of OG cancer starting palliative chemotherapy as first treatment within 9 months of diagnosis
Construction notes:	See approach to deriving palliative regimens in Appendix 11: Palliative SACT regimens	
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of SACT administration	Health board of SACT administration
Subgroup Reporting:	None	None
Risk adjusted:	No	No
Outlier reporting:	No	No

5.10 Performance Indicator 8: Mortality after starting systemic anti-cancer therapy (SACT)

Percentage of people with stage 4 OG cancer who died within 90 days of starting SACT.

Table 5.10: Percentage of people diagnosed with stage 4 disease dying within 90 days of starting systemic anti-cancer therapy (SACT)

	England	Wales
Dates of diagnosis:	1/1/2023 to 31/12/2024	1/1/2023 to 31/12/2024
Numerator: Number of people who died within 90 days of starting SACT	Number of people who died within 90 days of starting SACT	Number of people who died within 90 days of starting SACT
Denominator: Number of people with a primary diagnosis of stage 4 OG cancer who start any SACT regimen	Number of people with a primary diagnosis of stage 4 OG cancer who start any SACT regimen up to 9 months after diagnosis	Number of people with a primary diagnosis of stage 4 OG cancer who start any SACT regimen up to 9 months after diagnosis
Construction notes:	Exclude from analyses anyone who had a record of curative or indeterminate intent surgery or curative intent radiotherapy	
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of SACT administration	Health board of SACT administration
Subgroup Reporting:	Tumour site (oesophageal vs. gastric)	None
Risk adjusted:	No	No
Outlier reporting:	No	No

5.11 Survival indicator: One- and three-year survival

Table 5.11: Percentage of people diagnosed with OG cancer alive 1 year and 3 years after diagnosis		
	England	**Wales**
Dates of diagnosis:	1/1/2022 to 31/12/2023 (1 yr survival) 1/1/2020 to 31/12/2021 (3 yr survival)	1/1/2022 to 31/12/2023 (1 yr survival) 1/1/2020 to 31/12/2021 (3 yr survival)
Numerator: Number of people alive 1 year and 3 years after diagnosis	Number of people alive 1 year and 3 years after diagnosis	Number of people alive 1 year and 3 years after diagnosis
Denominator: Number of people with a primary diagnosis of OG cancer	Number of people with a primary diagnosis of OG cancer	Number of people with a primary diagnosis of OG cancer
Construction notes:		
Country reporting:	England & Wales separately	
Organisational Reporting level:	Trust of diagnosis; Cancer Alliance of diagnosis	Health board of diagnosis
Subgroup Reporting:	Tumour site (oesophageal vs. gastric); stage at diagnosis	Tumour site (oesophageal vs. gastric); stage at diagnosis
Risk adjusted:	Yes: Age at diagnosis, sex, index of multiple deprivation, stage at diagnosis, performance status, tumour site, Charlson comorbidity index, diagnosis year, treatment intent	No
Outlier reporting:	No	No

6. NHS organisations

The audit presents organisation-level findings by the NHS organisation of diagnosis or treatment, as appropriate for the specific indicator:

- OG specialist surgical centre: for indicators concerned with surgery
- Organisation of SACT administration: for indicators concerned with SACT
- Organisation of diagnosis: for all other indicators (in England this includes trust of diagnosis and Cancer Alliance of diagnosis, in Wales results are presented for the health board of diagnosis)

Details on allocation to NHS Trust in England:

- OG specialist surgical centres are identified via the HES dataset using the organisation codes listed in Appendix 13: Organisational codes.
- Trust of SACT administration is identified via the SACT dataset.
- Trust of diagnosis is identified using the trust of diagnosis variable in the RCRD.
- In instances where the trust of diagnosis is a tertiary centre (The Christie, The Clatterbridge, or The Royal Marsden), the audit reassigns the diagnosis to the trust of diagnostic endoscopy, when known. Note: The Royal Marsden does perform diagnostic endoscopy and therefore can remain the trust of diagnosis in some cases, whereas the other two tertiary centres do not. In cases where there is no record of diagnostic endoscopy the diagnosis cannot be reassigned; these cases are not reported at the Trust-level for The Christie or The Clatterbridge but they are included in Cancer Alliance and National-level reporting.
- Cases where the organisation of diagnosis is not an NHS organisation, or is a non-cancer diagnosing NHS trust, or is missing in cancer registration data are assigned to the trust of diagnostic endoscopy, where available. Otherwise, they are excluded from the Trust and Cancer Alliance-level analyses, but are included in national-level results.
- Cases in the English data where the organisation of diagnosis is an NHS Wales organisation are excluded from the England analyses, unless the case had surgery in England.

For Wales, the local health board of diagnosis and specialist surgical centres were identified using the organisation codes listed in Appendix 13: Organisational codes. The health board of diagnosis was identified using the organisation code variable in CaNISC data and primarydiagnosissitehospitalcode in CDF.

A minimum of ten diagnoses in the audit period is required for reporting at organisational level. This is to ensure only organisations providing cancer services are included and also to avoid very small numbers which can lead to unreliable estimates and increase the risk of potential data disclosure.

7. Statistical Analysis

All statistical analyses were conducted using STATA version 17.0.

Most results in the SotN Report are descriptive. Categorical data items are summarised as percentages (%). Results are typically provided as an overall figure with an indication of variation by organisational reporting level (see NHS organisations section). Note that within tables in the SotN Report the total percentage may not equal 100% due to rounding.

7.1 Small number suppression

- Data quality and completeness results have not been suppressed.
- For results presented at organisational level, cell values are suppressed when there are fewer than 25 diagnoses at the organisation and/or the denominator was <10.

7.2 Risk adjustment of indicators

The tables of performance indicators state whether risk adjustment was performed.

For each risk-adjusted indicator, multivariable logistic regression models were used to estimate the likelihood of the event for each individual based on their characteristics, and these probabilities were summed to calculate the predicted number of people with each event for each organisation. The regression models included the following patient characteristics: age group, sex, deprivation (IMD quintile), stage, performance status, tumour site (C15 or C16), RCS Charlson Comorbidity Index (calculated using HES-APC or PEDW), diagnosis year, and treatment intent (for overall survival indicator only). Data for England and Wales were analysed separately.

Table 7.1 below provides details on the datasets and variables used in the risk adjustment model. See section

Key Data Items for further details on construction notes for any of the variables listed.

Table 7.1: Risk Adjustment Variables		
Data Item	**Additional detail**	
	England	**Wales**
Age at diagnosis	Categorised into the following groups: <60, 60-69, 70-79, ≥80 years	N/A
Sex	No additional detail	N/A
Index of multiple deprivation	No additional detail	N/A
Stage at diagnosis	No additional detail	N/A
Performance status at diagnosis	Categorised into the following groups: 0, 1, 2, 3/4	N/A
Tumour site	Split into oesophageal and gastric	N/A
Charlson comorbidity index	The CCI is a commonly used scoring system for medical comorbidities, consisting of a grouped score calculated based on the absence (0) and presence (≥1) of 14 pre-specified medical conditions (Appendix 2). The CCI was calculated using information on secondary diagnoses (ICD-10 codes) recorded in HES APC (England) / PEDW (Wales) within the 24-month period prior to a patient's diagnosis. For the purpose of analysis, the CCI is grouped into four categories: • 0 none of the 14 pre-specified comorbidities. • 1 only 1 of the 14 pre-specified comorbidities. • 2 only 2 of the 14 pre-specified comorbidities • 3+ 3 or more of the 14 pre-specified comorbidities In instances where there were no HES-APC records for a person included in the audit, the variable chrl_tot_27_03 from NCRD was used as the CCI value.	
Diagnosis year	Year extracted from diagnosis date	N/A
Treatment intent	Split into groups of curative, non-curative, no disease-targeted treatment	N/A

7.3 Handling of missing data

For the risk-adjustment, missing values for stage and performance status 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.

7.4 Calculation of control limits

Control limits are calculated as follows:

State of the Nation report: performance indicator results are presented using funnel plots. Exact two-sided 95% binomial confidence limits around the national average were calculated for each denominator by identifying the event counts corresponding to the lower (2.5%) and upper (97.5%) tail probabilities of the binomial distribution. Smooth funnel limits were obtained using linear interpolation between adjacent event counts.

Quarterly report: performance indicator results are displayed for each organisation in line charts, with control limits calculated by adding and subtracting two standard errors to the national average. Standard errors use the average volume of patients at the healthcare provider per quarter across all quarters in the graph.

8. Outlier Process

The outlier process can be found in the NATCAN outlier policy.

Appendix 1: Routine data sources

Overview of the data sources used for the SotN Report.

Country	Data source	Content
England	Rapid Cancer registry (RCRD)	Data on all aspects of the cancer registration, compiled by NDRS.
England	COSD	Cancer Outcomes and Services dataset (COSD) items are submitted routinely by service providers via multidisciplinary team (MDT) electronic data collection systems to the National Cancer Data Repository (NCDR) on a monthly basis.
England	COSD Pathology	Pathology-specific dataset submitted to the NCDR on a monthly basis, to accompany the COSD dataset
England	SACT	Systemic Anti-Cancer Therapy (SACT) data contains information on chemotherapy dates, regimen(s) and dose(s).
England	RTDS	Radiotherapy dataset (RTDS) contains information on radiotherapy treatment including dates, prescription region and dose.
England	HES	Hospital Episode Statistics (HES) is the administrative database of all NHS hospital admissions in England. The audit receives records from both admitted patient care (HES-APC) and outpatient care (HES-OP).
Wales	CaNISC	Cancer Network Information System Cymru (CaNISC) contains data on all aspects of the cancer registration including investigations.
Wales	CDF	Cancer Dataset Form (CDF) contains data on all aspects of the cancer registration including investigations.
Wales	PEDW	Patient Episode Database for Wales (PEDW) is the administrative database of all NHS hospital admissions in Wales.
Wales	RTH	Radiotherapy data (RTH) contains information on radiotherapy treatment.
Wales	ONS	Office for National Statistics (ONS) death data including 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

Appendix 2: Charlson Comorbidity Index

Reference:

Armitage JN, van der Meulen JH. Identifying co-morbidity in surgical patients using administrative data with the Royal College of Surgeons Charlson Score. Br J Surg 2010;97:772-81. doi https://doi.org/10.1002/bjs.6930

Pre-specified conditions included in the assignment of Charlson Comorbidity Index (CCI).

CCI Conditions
Myocardial infarction
Dementia
Diabetes mellitus
Metastatic solid tumour
Congestive cardiac failure
Chronic pulmonary disease
Hemiplegia or paraplegia
AIDS/HIV infection
Peripheral vascular disease
Rheumatological disease
Renal disease
Cerebrovascular disease
Liver disease
Any malignancy

Note: AIDS/HIV diagnoses cannot be identified in HES APC data because of legal requirements for NHS trusts to remove patient identifiers from legally restricted records, including those containing diagnoses of HIV/AIDS. These diagnoses are also not found in linked PEDW data.

Appendix 3: Morphology codes for sub-types of oesophageal tumours

List restricted to the two most common sub-types of oesophageal cancer. List may not be exhaustive of all adenocarcinoma or squamous cell morphology as list is based on the morphologies present in the audit cohort.

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

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

Appendix 4: Morphology codes 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
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

Code	Description
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 descriptions: https://biobank.ndph.ox.ac.uk/ukb/ukb/docs/ICDcancermorph.pdf

Appendix 5: Morphology codes 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 tumour
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
8249	Atypical carcinoid tumour
9091	Strumal carcinoid

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

Appendix 6: OPCS-4 codes used to flag diagnostic endoscopy

OPCS-4 code	Description
G14.2	Fibreoptic endoscopic laser destruction of lesion of oesophagus
G14.3	Fibreoptic endoscopic cauterisation of lesion of oesophagus
G14.5	Fibreoptic endoscopic destruction of lesion of oesophagus NEC
G14.7	Fibreoptic endoscopic photodynamic therapy of lesion of oesophagus
G15.2	Fibreoptic endoscopic balloon dilation of oesophagus
G15.3	Fibreoptic endoscopic dilation of oesophagus NEC
G15.4	Fibreoptic endoscopic insertion of tubal prosthesis into oesophagus
G15.6	Fibreoptic endoscopic insertion of expanding metal stent into oesophagus NEC
G15.7	Fibreoptic endoscopic insertion of expanding covered metal stent into oesophagus
G15.8	Other therapeutic fibreoptic endoscopic operations on oesophagus, other specified
G15.9	Other therapeutic fibreoptic endoscopic operations on oesophagus, unspecified
G16.1	Diagnostic fibreoptic endoscopic examination of oesophagus and biopsy of lesion of oesophagus
G16.2	Diagnostic fibreoptic endoscopic ultrasound examination of oesophagus
G16.8	Diagnostic fibreoptic endoscopic examination of oesophagus, other specified
G16.9	Diagnostic fibreoptic endoscopic examination of oesophagus, unspecified
G17.2	Endoscopic laser destruction of lesion of oesophagus using rigid oesophagoscope
G17.3	Endoscopic cauterisation of lesion of oesophagus using rigid oesophagoscope
G18.8	Other therapeutic endoscopic operations on oesophagus using rigid oesophagoscope, other specified
G18.9	Other therapeutic endoscopic operations on oesophagus using rigid oesophagoscope, unspecified
G19.1	Diagnostic endoscopic examination of oesophagus and biopsy of lesion of oesophagus using rigid oesophagoscope
G19.8	Diagnostic endoscopic examination of oesophagus using rigid oesophagoscope, other specified
G19.9	Diagnostic endoscopic examination of oesophagus using rigid oesophagoscope, unspecified
G20.1	Fibreoptic endoscopic coagulation of bleeding lesion of oesophagus NEC
G20.2	Fibreoptic endoscopic coagulation of bleeding lesion of oesophagus using haemostatic spray
G20.8	Therapeutic fibreoptic endoscopic operations on oesophagus, other specified
G20.9	Therapeutic fibreoptic endoscopic operations on oesophagus, unspecified
G21.4	Intubation of oesophagus NEC
G21.5	Insertion of stent into oesophagus NEC
G21.8	Other operations on oesophagus, other specified
G21.9	Other operations on oesophagus, unspecified
G42.2	Fibreoptic endoscopic photodynamic therapy of lesion of upper gastrointestinal tract
G43.2	Fibreoptic endoscopic laser destruction of lesion of upper gastrointestinal tract
G43.3	Fibreoptic endoscopic cauterisation of lesion of upper gastrointestinal tract
G43.5	Fibreoptic endoscopic destruction of lesion of upper gastrointestinal tract NEC
G44.1	Fibreoptic endoscopic insertion of prosthesis into upper gastrointestinal tract
G44.3	Fibreoptic endoscopic dilation of upper gastrointestinal tract NEC
G44.5	Fibreoptic endoscopic percutaneous insertion of gastrostomy
G44.6	Fibreoptic endoscopic pressure controlled balloon dilation of lower oesophageal sphincter
G44.8	Other therapeutic fibreoptic endoscopic operations on upper gastrointestinal tract, other specified
G44.9	Other therapeutic fibreoptic endoscopic operations on upper gastrointestinal tract, unspecified
G45.1	Fibreoptic endoscopic examination of upper gastrointestinal tract and biopsy of lesion of upper gastrointestinal tract
G45.2	Fibreoptic endoscopic ultrasound examination of upper gastrointestinal tract
G45.4	Fibreoptic endoscopic examination of upper gastrointestinal tract and staining of gastric mucosa

OPCS-4 code	Description
G45.8	Diagnostic fibreoptic endoscopic examination of upper gastrointestinal tract, other specified
G45.9	Diagnostic fibreoptic endoscopic examination of upper gastrointestinal tract, unspecified
G46.2	Fibreoptic endoscopic coagulation of bleeding lesion of upper gastrointestinal tract NEC
G46.3	Fibreoptic endoscopic coagulation of bleeding lesion of upper gastrointestinal tract using haemostatic spray
G46.8	Therapeutic fibreoptic endoscopic operations on upper gastrointestinal tract, other specified
G46.9	Therapeutic fibreoptic endoscopic operations on upper gastrointestinal tract, unspecified

Appendix 7: OPCS-4 codes for EMR/ESD

OPCS-4 code	Description
G12.1	Fibreoptic endoscopic mucosal resection of lesion of oesophagus
G12.8	Other fibreoptic endoscopic extirpation of lesion of oesophagus, other specified
G12.9	Other fibreoptic endoscopic extirpation of lesion of oesophagus, unspecified
G14.1	Fibreoptic endoscopic snare resection of lesion of oesophagus
G14.6	Fibreoptic endoscopic submucosal resection of lesion of oesophagus
G14.8	Fibreoptic endoscopic extirpation of lesion of oesophagus, other specified
G14.9	Fibreoptic endoscopic extirpation of lesion of oesophagus, unspecified
G17.1	Endoscopic snare resection of lesion of oesophagus using rigid oesophagoscope
G17.8	Endoscopic extirpation of lesion of oesophagus using rigid oesophagoscope, other specified
G17.9	Endoscopic extirpation of lesion of oesophagus using rigid oesophagoscope, unspecified
G42.1	Fibreoptic endoscopic submucosal resection of lesion of upper gastrointestinal tract
G42.3	Fibreoptic endoscopic mucosal resection of lesion of upper gastrointestinal tract
G42.8	Other fibreoptic endoscopic extirpation of lesion of upper gastrointestinal tract, other specified
G42.9	Other fibreoptic endoscopic extirpation of lesion of upper gastrointestinal tract, unspecified
G43.1	Fibreoptic endoscopic snare resection of lesion of upper gastrointestinal tract
G43.8	Fibreoptic endoscopic extirpation of lesion of upper gastrointestinal tract, other specified
G43.9	Fibreoptic endoscopic extirpation of lesion of upper gastrointestinal tract, unspecified
Codes used only for High Grade Dysplasia (HGD) in addition to the codes above	
G14.3	Fibreoptic endoscopic cauterisation of lesion of oesophagus
G14.5	Fibreoptic endoscopic destruction of lesion of oesophagus NEC
G43.3	Fibreoptic endoscopic cauterisation of lesion of upper gastrointestinal tract
G43.5	Fibreoptic endoscopic destruction of lesion of upper gastrointestinal tract NEC

Appendix 8: OPCS-4 codes for major oesophageal or 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/

Appendix 9: OPCS-4 codes for surgery approach

OPCS-4 code	Description
Robotic approach	
Y45.2	Approach to organ under robotic control NEC
Y74.3	Robotic minimal access approach to thoracic cavity
Y75.3	Robotic minimal access approach to abdominal cavity
Y76.5	Robotic assisted minimal access approach to other body cavity
Minimally invasive approach	
Y741	Thoracoscopically assisted approach to thoracic cavity
Y742	Thoracoscopic approach to thoracic cavity NEC
Y744	Thoracoscopic video-assisted approach to thoracic cavity
Y748	Minimal access to thoracic cavity: Other specified
Y749	Minimal access to thoracic cavity: Unspecified
Y751	Laparoscopically assisted approach to abdominal cavity
Y752	Laparoscopic approach to abdominal cavity NEC
Y754	Hand assisted minimal access approach to abdominal cavity
Y758	Minimal access to abdominal cavity: Other specified
Y759	Minimal access to abdominal cavity: Unspecified
Open approach	
Y493	Thoracotomy approach NEC
Y498	Approach through thoracic cavity: Other specified
Y499	Approach through thoracic cavity: Unspecified
Y502	Approach through abdominal cavity: Laparotomy approach NEC
Y508	Approach through abdominal cavity: Other specified
Y509	Approach through abdominal cavity: Unspecified

Appendix 10: OPCS-4 codes for SACT administration

OPCS-4 code	Description
X701	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 1
X702	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 2
X703	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 3
X704	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 4
X705	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 5
X708	Procurement of drugs for chemotherapy for neoplasm in Bands 1-5: Other specified
X709	Procurement of drugs for chemotherapy for neoplasm in Bands 1-5: Unspecified
X711	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 6
X712	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 7
X713	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 8
X714	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 9
X715	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 10
X718	Procurement of drugs for chemotherapy for neoplasm in Bands 6-10: Other specified
X719	Procurement of drugs for chemotherapy for neoplasm in Bands 6-10: Unspecified
X721	Delivery of complex chemotherapy for neoplasm including prolonged infusional treatment at first attendance
X722	Delivery of complex parenteral chemotherapy for neoplasm at first attendance
X723	Delivery of simple parenteral chemotherapy for neoplasm at first attendance
X724	Delivery of subsequent element of cycle of chemotherapy for neoplasm
X728	Delivery of chemotherapy for neoplasm: Other specified
X729	Delivery of chemotherapy for neoplasm: Unspecified
X731	Delivery of exclusively oral chemotherapy for neoplasm
X738	Delivery of oral chemotherapy for neoplasm: Other specified
X739	Delivery of oral chemotherapy for neoplasm: Unspecified
X748	Other chemotherapy drugs: Other specified
X749	Other chemotherapy drugs: Unspecified
X352	Intravenous chemotherapy
X353	Intravenous immunotherapy
X373	Intramuscular chemotherapy
X374	Intramuscular immunotherapy
X384	Subcutaneous chemotherapy
X385	Subcutaneous immunotherapy

Appendix 11: Palliative SACT regimens

Cycles of SACT are flagged as palliative if within the SACT database the variable *benchmark_group* is any of the following AND there is no record of curative or indeterminate intent surgery or curative/neoadjuvant/adjuvant/indeterminant radiotherapy within 9 months after diagnosis:

1. **Immunotherapy:** any of "PEMBROLIZUMAB" or “NIVOLUMAB”, alone or in combination with other drugs
2. **Trastuzumab-containing regimens:** any regimen containing “TRASTUZUMAB”
3. **Triplet regimens:** any of "CISPLATIN + CAPECITABINE + EPIRUBICIN" or "CAPECITABINE + CISPLATIN + EPIRUBICIN" or "CAPECITABINE + EPIRUBICIN + OXALIPLATIN" or "CISPLATIN + EPIRUBICIN + FLUOROURACIL" or "EPIRUBICIN + FLUOROURACIL + OXALIPLATIN"
4. **Double regimens:** any platinum+5FU combination below: "FLUOROURACIL + OXALIPLATIN" or "CISPLATIN + FLUOROURACIL" or "CAPECITABINE + OXALIPLATIN" or "CAPECITABINE + CISPLATIN" or "CAPECITABINE + CARBOPLATIN" or "CARBOPLATIN + FLUOROURACIL" or "CISPLATIN + TEGAFUR" or "OXALIPLATIN + TEGAFUR" or "CARBOPLATIN + TEGAFUR" or "NEDAPLATIN + FLUOROURACIL" or "NEDAPLATIN + CAPECITABINE" or "NEDAPLATIN + TEGAFUR"
5. **Doublet regimens:** "CARBOPLATIN + PACLITAXEL"

Appendix 12: World Health Organisation Performance Status

Performance status	Definition
0	Able to carry out all normal activity without restriction
1	Restricted in strenuous activity but ambulatory and able to carry out light work
2	Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours
3	Symptomatic and in a chair or in bed for greater than 50% of the day but not bedridden
4	Completely disabled; cannot carry out any self-care; totally confined to bed or chair

Source: Definition in COSD Core (Performance Status (Adult)), COSD v10.0 downloads - NDRS.

Appendix 13: Organisational codes

Trust codes and names for OG surgical specialist centres in England:

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

Organisation codes for Local Health Boards in Wales:

Organisation code	Local Health Board
7A1	Betsi Cadwaladr University Health Board
7A2	Hywel Dda University Health Board
7A3	Swansea Bay University Health Board
7A4	Cardiff and Vale University Health Board
7A5	Cwm Taf Morgannwg University Health Board
7A6	Aneurin Bevan University Health Board