



Public Health
England



CANCER
RESEARCH
UK

Protecting and improving the nation's health

CAS-SOP #4.6

Linking treatment tables – chemotherapy,
tumour resections and radiotherapy

Version 4.6

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

This report has been produced as part of the Cancer Research UK (CRUK) – Public Health England (PHE) partnership.

Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000
www.gov.uk/phe
Twitter: [@PHE_uk](https://twitter.com/PHE_uk)
Facebook: www.facebook.com/PublicHealthEngland

For queries relating to this document, please contact: NCRASenquiries@phe.gov.uk

© Crown copyright 2021

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence, please visit [OGL](https://www.ogil.io) or email psi@nationalarchives.gsi.gov.uk. Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

Published: October 2017
Corrected: February 2018
Updated: May 2018
Corrected: July 2018
Updated: June 2019
Updated: April 2021
PHE publications
gateway number: 2017508

PHE supports the UN
Sustainable Development Goals



Contents

Introduction	4
Method	6
Appendix 1: Code changes compared to SOP version 4.5	14
Appendix 2: Summary of tumour sites & timeframe rules	16
Appendix 3: Site-specific summary of tumour resection rules	18
Appendix 4: Example code	39
Appendix 5: Datasets used	78
Appendix 6: Sensitivity analysis – impact of tumour resection code update	79
Appendix 7: Sensitivity analysis – impact of timeframe update	80

Introduction

This Standard Operating Procedure (SOP) (v4.6) updates the previous version (v4.5), incorporating ICD10 codes, resection procedure codes and treatment time frames specific to 5X tumour sites. The affected tumour sites are Brain (benign endocrine), Brain (non-malignant brain), Melanoma, Non-Melanoma Skin Cancer (NMSC): Basal Cell Carcinoma (BCC), NMSC: cutaneous Squamous Cell Carcinoma (cSCC), NMSC: other. It also updates the previous SOP to include tumours diagnosed in 2017 and 2018. The changes to the code are summarised in Appendix 1 of this document. Additional ICD10 codes are included in Appendix 2. Updated resection procedure codes are provided in Appendix 3.

The purpose of this SOP is to describe the method of linking treatment tables to the cancer registration data in the Cancer Analysis System (CAS). This allows basic treatment flags to be created; recording whether there was chemotherapy, tumour resection, or radiotherapy recorded following cancer diagnosis. This method was used for recent NCRAS publications of treatment work including the workbook 'Chemotherapy, Radiotherapy and Tumour Resections in England, 2013 – 2015' (available [here](#)).

The cancer sites included are the 31 sites which have pre-defined lists of relevant tumour resection procedures. All other sites are grouped under either 'other malignant' or 'other non-malignant' tumours. The term 'tumour resection' (previously termed 'major resection' in other outputs) is used to describe surgical attempts to remove the primary tumour. This SOP replaces the previous method used to count tumour resections (available [here](#)).

Cancer site and treatment-specific timeframes have been adopted to strike a balance between including as many treatments as possible carried out as part of the patient's first course of treatment for that tumour, while minimising the inclusion of treatments for recurrent tumours.

This SOP is to be used where the analyst wishes to extract data on treatments among cancer sites listed in Appendix 2. The cancer sites with a tumour resection flag have been chosen because they are solid tumours (so are potentially resectable); are commonly diagnosed; and input from a site-specific clinician was available. Expansion of this list to include more cancer sites, where resection is a treatment choice, will be considered for future NCRAS work. Chemotherapy and radiotherapy data was available for all cancer sites. This SOP exists to set a standard that can be followed to produce uniform and replicable results and, in particular, for external requests for treatment data received via the Office for Data Release (ODR). Certain specific uses may require a

different approach and should be discussed with the lead of the therapeutics functional team.

The specific procedure codes used to select tumour resections are listed in Appendix 3. The SQL script which accompanies this SOP is in Appendix 4. The SQL code produces tumour-level data with 3 treatment flags (chemotherapy [CT], tumour resection [SG] and radiotherapy [RT]), with 0 as no treatment and 1 where treatment is present.

Method

Cohort definition

Cancer registry data from AT_TUMOUR_ENGLAND is used as the base to identify the cohort of patients. All patients diagnosed with malignant cancer in England in 2013-2018 were included. This version additionally includes benign neoplasm or neoplasms of the brain, melanoma, and non-melanoma skin cancer of uncertain behaviour. Males with gynaecological cancer and females with prostate cancer were excluded. Death certificate only registrations are included (1.2% of the cohort).

Overall approach to identify treatments

The datasets used to collate tumour resection data are AT_TREATMENT_ENGLAND (CAS 2102 snapshot onwards can be used), SACT (Systemic Anti-Cancer Therapy), RTDS (RadioTherapy DataSet), and inpatient (Admitted Patient Care (APC)) HES (Hospital Episode Statistics). The AT_TREATMENT_ENGLAND table is linked at tumour level, based on registration staff linking tumours to recorded treatments. Appendix 5 details the datasets and Snapshots used in this update.

The scope of this SOP is tumours diagnosed from 2013 onwards as it is known that the data quality in AT_TREATMENT_ENGLAND and SACT is lower before this point. However, treatment flags for select groups (e.g. childhood cancers) may be fairly complete in AT_TREATMENT_ENGLAND for earlier years. Cancer Waiting Times (CWT) data is not currently used. This decision was made following an assessment of the coverage of the datasets, and as $\geq 98\%$ of radiotherapy and $\geq 94\%$ of chemotherapy were captured by registry, SACT and RTDS in the period October 2012 to March 2013 (with the data completeness believed to be increasing since) it did not justify the complication of including CWT data.

For patients with one tumour diagnosed in 2013-2018, and those patients with multiple tumours diagnosed more than eighteen months apart, data from both the tumour linked table (AT_TREATMENT_ENGLAND) and the patient linked tables (SACT, RTDS and HES) is used. However, for patients with two or more tumours diagnosed within eighteen months of each other, only data from the tumour-linked table (i.e., AT_TREATMENT_ENGLAND) is used. This is because for the patient linked tables, the precise tumour that a treatment relates to is not identified, only the person. The current scope of this SOP is to define a working methodology for counting treatments in the absence of tumour level linked data, but this may be modified as and when further tumour-linked treatment data becomes available.

Tumours which received the same treatment more than once are only counted once.

Early stage tumour resections

Previous resections work relied upon lists of procedure codes (OPCS-4 codes) which would be used to remove the primary tumour (available [here](#)). These lists were defined in consultation with experienced clinicians. Lack of data on stage at diagnosis at the time of definition meant that the lists were conservative, and each code would apply across all tumours of that particular site regardless of stage. Now that high quality stage at diagnosis data is available for most sites, the list of OPCS-4 procedure codes used to define tumour resections has been adapted to include tumour resections for early stage tumours. Site-specific clinicians were consulted for the 31 sites included in the original major resection list, and stage-specific rules have now been incorporated for relevant sites (cervical, colon, rectum, bladder, liver, oesophageal and stomach cancers).

In addition to the existing tumour resection list, the following procedures were identified as tumour resections in early stage disease only:

Cervical	Cone biopsies for FIGO stage 1a tumours, and also those with stage 1b & 1b1 disease if the patient also had a lymphadenectomy
Colon and rectum	Endoscopic resections and endoscopic biopsy procedures for TNM stage 1 tumours
Bladder	Endoscopic resections, destructions, and cauterisation of lesion of bladder (TURBT) and other specified endoscopic extirpation of lesion of bladder for T1 (non-muscle invasive) tumours
Liver	Percutaneous radiofrequency and microwave ablation of lesion of liver for TNM stage 1 tumours
Oesophagus	Fibreoptic endoscopic resection of lesions of upper gastrointestinal tract and oesophagus for TNM stage 1a tumours
Stomach	Fibreoptic endoscopic resection of lesion of upper gastrointestinal tract and oesophagus for TNM stage 1a tumours

In addition, after clinical review certain OPCS-4 codes were added to or removed from the previous list for all stages of disease. For more information, see Appendix 3, and

Appendix 6 for a sensitivity analysis showing the impact of adding stage-specific tumour resections.

Timeframe

European Network of Cancer Registries (ENCR) rules state that date of diagnosis is recorded as the date of most recent pathological confirmation. This means that date of diagnosis can be shortly after a surgical resection. To avoid excluding relevant data, treatments in the one month (-31 days inclusive) prior to diagnosis were included in the analysis.

A data-driven approach with additional input from site-specialist clinicians was used to decide a site- and modality- specific post-diagnosis timeframe. The timeframe was chosen to be long enough to capture as many treatments as possible as part of the patient's primary course of treatment, while also minimising the inclusion of treatments for recurrence. This SOP counts treatments between one month before, to up to eighteen months after diagnosis, with the exact timeframe depending on the site and treatment type. For patients who received each treatment for each cancer, the number of days after diagnosis at which 95% of these patients received the treatment was identified. This was rounded up to the nearest three month interval, and this timeframe cut off was applied. Post-diagnosis timeframes were therefore 6, 9, 12, 15 or 18 months. The timeframes were based on 2013 and 2014 data only, because of the length of follow-up data required.

For example, of the pancreatic tumours diagnosed in 2013-14 which received a tumour resection within two years of diagnosis, 95% had their resection within 226 days. Therefore for all pancreatic cancers diagnosed in 2013-2016, a post-diagnosis tumour resection timeframe of 274 days (9 months) was applied. Exceptions to the data driven approach were made for particular treatments for certain cancer sites under recommendation from clinicians. For these sites, clinicians decided the timeframe using a combination of their own experience and the data. See Appendix 2 for details, and Appendix 7 for a sensitivity analysis showing the impact of changing the timeframes.

Relative to other tumour sites, treatment data quality for non-melanoma skin cancers (NMSC) (BCC, cSCC and other NMSC tumours) is poor, with only ~75% of tumours registered according to the UKIACR method (counting only the first ever registered tumour for BCC and cSCC cancers and counting all instances of other NMSC tumours, see CAS SOP Counting non-melanoma skin cancers C44) having treatment data. A data-driven approach failed to identify 95% of chemotherapy and radiotherapy treatments within an appropriate timeframe. Clinician input was therefore used to decide suitable timeframes for treatment periods, with the view that quantifying the current state of treatment data can be used as a base to improve overall data quality. These figures should therefore be considered provisional and are expected to be incomplete.

SQL rules used to identify treatments

In order to match the output from CancerStats, the `cascade_inci_flag` (from the registry `AT_TUMOUR_ENGLAND` base table) must equal 1 (refer to the standard operating procedure “CAS-SOP #1: Counting Cancer Cases” for further information on this, available on request to NCRAS). This SOP applies to CAS 1612 onwards, as it uses the newly categorised treatments implemented in December 2016.

Chemotherapy

A tumour is recorded as treated with chemotherapy if:

- there is a record in `AT_TREATMENT_ENGLAND` which states that the tumour was treated with chemotherapy (event is either 'Cytotoxic Chemotherapy' (code = 02) or 'CT - Other' (code = CTX) or 'chemoradiotherapy' (code = 04) or 'radioisotope therapy (including radioiodine)' (code = 19) or 'Immunotherapy' (code = 15))
- and the event date (`EVENTDATE`) occurred in the relevant timeframe (see Appendix 2)

OR

- there is a record in `SACT` (excluding those null or classified as 'Hormones' or 'Not chemo' or 'Zoledronic acid' or 'Pamidronate' or 'Denosumab')
- and the start date of the regimen (`START_DATE_OF_REGIMEN`) occurred in the relevant timeframe
- and the patient had no other tumours diagnosed in the 18 months before or after that tumour's diagnosis date

`SACT` is linked to cancer registration where NHS numbers are a perfect match. Regimen mappings are based on both those directly confirmed by trusts, and those assigned by the `SACT` team (for example where trusts haven't addressed unmapped regimens).

Tumour resections

A tumour is recorded as treated by resection if:

- there is a record in `AT_TREATMENT_ENGLAND` which states that the tumour was treated with surgery (event is '01a', '01b', or '01z')
- and the `OPCS4_CODE` is in the tumour resection list
 - or the `OPCS4_CODE` is identified as a tumour resection in early stage tumours for that specific cancer site (see Appendix 3)
- and the operation date (`OPERTN`) occurred in the relevant timeframe (see Appendix 2)

OR

- there is an inpatient HES episode with a tumour resection OPCS-4 code in one of the operation fields
 - or one of the operation fields contains an OPCS-4 code identified as a tumour resection in early stage tumours for that specific cancer site (see Appendix 3)
- and the operation date (OPERTN) occurred in the relevant timeframe
- and the patient had no other tumours diagnosed in the 18 months before or after that tumour's diagnosis date

HES is linked to the cancer registration using a matching algorithm taking into account NHS number, date of birth, sex and postcode at diagnosis (details available on request to NCRAS).

Radiotherapy

A tumour is recorded as treated with radiotherapy if:

- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with radiotherapy (event is either 'RT - Teletherapy' (code = 05) or 'chemoradiotherapy' (code = 04) or 'radiosurgery' (code = 22) or 'RT - Other/ NK' (code = RTX))
- and the event date (EVENTDATE) occurred in the relevant timeframe (see Appendix 2)

OR

- there is a record in RTDS (excluding those classed as Brachytherapy, i.e., with RTTREATMENTMODALITY='06')
- and the appointment date (APPTDATE) occurred in the relevant timeframe
- and the patient had no other tumours diagnosed in the 18 months before or after that tumour's diagnosis date

RTDS is linked to the cancer registration using a matching algorithm taking into account NHS number, date of birth, sex and postcode at diagnosis (details available on request to NCRAS). Brachytherapy was excluded from the definition of radiotherapy because further investigation into its completeness is needed first. Radiotherapy figures are likely to be an underestimate as there is underreporting of teletherapy in both RTDS datasets, and data may be incomplete for selected NHS Trusts.

From 1 April 2016, PHE took over full responsibility for RTDS, allowing greater integration of the management, collection, quality assurance and analysis of radiotherapy data alongside the other major national cancer data sets in its charge. For patients whose follow up period for radiotherapy extended past April 2016, the RTDS.AT_PRESCRIPTIONS dataset in CAS1902 was used.

Results breakdowns

Results are broken down by 31 tumour sites; the ICD-10 codes used to define these can be found in Appendix 2.

Stage breakdowns in the data release use TNM staging, except for gynaecological cancers which use Figo staging. For cervical cancers, only FIGO staging was used. For ovarian, uterine and vulval cancers, TNM stage was used where Figo stage was unknown. Figo substages were collated into Figo stages 1, 2, 3, 4, and unknown. To remain consistent with published stage data, Breast tumours (C50) with Paget's disease were excluded. The final recorded stage of a tumour is derived by the registration service using all information available up to 3 months after diagnosis. For this reason, the tumour stage shown in this data may be different to the stage originally available to the clinician when deciding a course of treatment, as it may have been subsequently updated following removal of the tumour and pathology results.

The patient's age group was based on the age of the patient when they were diagnosed with the tumour.

The patient's income deprivation quintile was allocated by linking the patient's postcode to their 2011 ONS census Lower Super Output Area (LSOA). This was then linked to the Ministry of Housing, Communities & Local Government 2015 income deprivation quintile for that LSOA.

The patient's Charlson comorbidity score was derived from Hospital Episodes Statistics (HES) and Cancer Registry data combined, and looks back at the time period between 27 months to 3 months before the patient's cancer diagnosis.

The patient's Cancer Alliance was allocated based on their Cancer Alliance of residence at point of diagnosis, not the location(s) where they were treated.

Appendix 1: Code changes in SOP version 4.6 compared to 4.5

Changes have been made to the extraction code in SOP version 4.6 since SOP version 4.5 was published for 2013-2016 diagnoses. These are noted below. Only non-superficial changes are noted; i.e. changes that could potentially impact the results.

Timeframe lookup table

The timeframe lookup table was updated to include timeframes for brain (benign endocrine), brain (non-malignant brain) skin (melanoma), skin (non-melanoma skin cancer (NMSC)), and other non-malignant neoplasms (see Appendix 2).

Tumour cohort table

- Brain has been redefined into “malignant brain” (C70-C72) and “non-benign endocrine” (C75Brain, D44Brain) in accordance with the Get Data Out programme. Additional morphology codes have been used to define non-benign endocrine codes (D44) as opposed to “Other” (non-brain) D code tumours in the tumour_cohort table. The 3 digit ICD10 code is defined as “D44Brain” and “D44Other”, depending on the morphology of the tumour.
- Non-malignant brain and benign endocrine have been added as tumour sites. Morphology codes have been used to define non-malignant brain (D32Brain, D33Brain, D42Brain, D43Brain) and benign endocrine (D35Brain) tumours as opposed to “Other” (non-brain) D code tumours in the tumour_cohort table, in accordance with the Get Data Out programme. The 3 digit ICD10 codes are defined as D32Other”, “D33Other”, “D35Other”, “D42Other”, “D43Other”, and “D32Brain”, “D33Brain”, “D35Brain”, “D42Brain”, “D43Brain”, respectively, depending on the morphology of the tumour.
- Melanoma skin cancer has been defined as tumours with ICD10 code “C43”.
- Non-melanoma skin cancers (NMSC) have been defined as either basal cell carcinoma (NMSC_BCC), cutaneous squamous-cell carcinoma (NMSC_cSCC) and other non-melanoma skin cancers (NMSC_OTHER). Morphology codes have been used to define NMSC tumour type as either “C44BCC”, “C44CSCC” or “C44OTHER”. Following UKIACR method of counting only the first ever registered tumour for BCC and cSCC cancers, and counting all instances of other NMSC tumours.
- Non-malignant tumours not already defined for e.g. brain codes are defined as ‘Other Malignant’ and are defined by morphology codes.
- The Snapshot used for AT_TUMOUR_ENGLAND and AT_TREATMENT_ENGLAND was updated to 2102.
- Trust codes are now available to show which trust a treatment was delivered in.

Chemotherapy flag

- The Snapshot used for AT_TREATMENT_ENGLAND was updated to 2102.

Tumour resection flag

- Specific resection codes and the site specific timeframes were added or updated for Bladder, Kidney, and Testes (see appendices 2 and 3).

Radiotherapy flag

- The Snapshots used for AT_TREATMENT_ENGLAND and for the RTDS dataset post April 2016 were updated to 2102.

Appendix 2: Summary of tumour sites & timeframe rules

Cancer site	ICD10 codes	Days included as post-diagnostic time period (months)		
		Chemotherapy	Tumour resections	Radiotherapy
Bladder	C67	365 (12)	274 (9)	365 (12)*
Brain: Benign endocrine ^	D35.2-D35.4	547 (18)	365 (12)	547 (18)
Brain: Malignant brain,	C70-72	547 (18)	183 (6)	365 (12)
Brain: Non-benign endocrine	C75.1-C75.3 D44.3-D44.5	547 (18)	183 (6)	365 (12)
Brain: Non-malignant brain ^	D32-D33, D42-D44.5	547 (18)	365 (12)	547 (18)
Breast	C50	365 (12)*	365 (12)*	365 (12)*
Cervical	C53	274 (9)*	274 (9)*	274 (9)*
Colorectal: Colon	C18-19	365 (12)*	183 (6)*	365 (12)*
Colorectal: Rectum	C20	365 (12)*	365 (12)*	365 (12)*
Hypopharynx	C12, C13	183 (6)	365 (12)	183 (6)
Larynx	C32	365 (12)	456 (15)	183 (6)
Oral cavity	C02, C03, C04, C06	456 (15)	183 (6)	456 (15)
Oropharynx	C01, C09, C10	183 (6)	365 (12)	183 (6)
Other head and neck	C05, C11, C14, C30, C31	365 (12)	456 (15)	274 (9)
Salivary glands	C07, C08	547 (18)	183 (6)	274 (9)
Kidney	C64-C66, C68	365 (12)*	183 (6)	365 (12)*
Liver	C22	456 (15)	365 (12)	547 (18)
SCLC	C33-C34 with ICD-O-2 morphology in list 8041, 8042, 8043, 8044, 8045	183 (6)*	183 (6)*	183 (6)*
NSCLC	C33-C34 with ICD-O-2 morphology not in list 8041, 8042, 8043, 8044, 8045	183 (6)*	183 (6)*	183 (6)*
Oesophagus	C15	183 (6)	274 (9)	274 (9)*
Ovary	C56-C57, C48 (females, excluding ICD-O-2 8693, 8800-8806, 8963, 8990, 8991, 9040-9044, 8810-8921, 9120-9373, 9490, 9500, 9530-9582), D39.1	274 (9)*	274 (9)*	274 (9)*
Pancreas	C25	183 (6)	274 (9)	547 (18)
Prostate	C61	365 (12)*	456 (15)	365 (12)*
Skin: Melanoma ^	C43	456 (15)	183 (6)	547 (18)
Skin: NMSC BCC ^	C44 with ICD-O-2 morphology in list 8090, 8091, 8092, 8093, 8094, 8095, 8097	547 (18)	365 (12)	547 (18)
Skin: NMSC cSCC ^	C44 with ICD-O-2 morphology in list 8050, 8051, 8052, 8054, 8070, 8071, 8072, 8073, 8074,	456 (15)	183 (6)	547 (18)

CAS-SOP #4: Linking treatment tables

Skin: NMSC rare ^	8075, 8076, 8077, 8078, 8082, 8083, 8084, 8085, 8086 C44 with ICD-O-2 morphology not in list 8050, 8051, 8052, 8054, 8070, 8071, 8072, 8073, 8074, 8075, 8076, 8077, 8078, 8082, 8083, 8084, 8085, 8086, 8090, 8091, 8092, 8093, 8094, 8095, 8097	456 (15)	183 (6)	547 (18)
Stomach	C16	183 (6)	274 (9)	274 (9)*
Testis	C62, D29.2	274 (9)	183 (6)	547(18)
Uterine	C54-C55	274 (9)*	274 (9)*	274 (9)*
Vulva	C51	274 (9)*	274 (9)*	274 (9)*
Other malignant neoplasms	C00, C17, C21, C23-C24, C26, C37-C42, C45-C48, non-ovarian C48, C49, C52, C58-C60, C63, C69, C75.0, C75.4-C97	456 (15)	N/A	547 (18)
Other non-malignant neoplasms^	D00, D02, D05, D09-D10, D12, D14, D17, D19-D24, D26, D28, D30, D31, D34, D35.0-D35.1, D35.5-D35.9, D37-D38, D41, D44.0-D44.2, D44.6-D44.9, D45-D47	456 (15)	183 (6)	547 (18)

The following ICD 10 codes and post-diagnostic treatment time periods were used for the cancer sites presented in this workbook. The time periods were identified using a data driven approach detailed in CAS-SOP #4.4, with exceptions(*) made for particular treatments for certain cancer sites under recommendation from clinicians. These timeframes were chosen by clinicians using their own experience and the data. [^Updated in this version]

Appendix 3: Site-specific summary of tumour resection rules

OPCS-4 code	Procedure name	Notes
Bladder (C67)		
M421	Endoscopic resection of lesion of bladder	Non muscle invasive (T1) tumours only
M422	Endoscopic cauterisation of lesion of bladder	Non muscle invasive (T1) tumours only.
M423	Endoscopic destruction of lesion of bladder NEC	Non muscle invasive (T1) tumours only
M428	Other specified endoscopic extirpation of lesion of bladder	Non muscle invasive (T1) tumours only
M429	Unspecified endoscopic extirpation of lesion of bladder	Non muscle invasive (T1) tumours only
M341	Cystoprostatectomy	
M342	Cystourethrectomy	
M343	Cystectomy NEC	
M344	Simple cystectomy	
M348	Other specified total excision of bladder	
M349	Unspecified total excision of bladder	
M359	Unspecified partial excision of bladder	
X142	Anterior exenteration of pelvis	
Brain (C70-C72, C75.1-C75.3)		
A011	Hemispherectomy	
A012	Total lobectomy of brain	
A013	Partial lobectomy of brain	
A018	Other specified major excision of tissue of brain	
A019	Unspecified major excision of tissue of brain	
A021	Excision of lesion of tissue of frontal lobe of brain	
A022	Excision of lesion of tissue of temporal lobe of brain	
A023	Excision of lesion of tissue of parietal lobe of brain	
A024	Excision of lesion of tissue of occipital lobe of brain	
A025	Excision of lesion of tissue of cerebellum	
A026	Excision of lesion of tissue of brain stem	
A028	Other specified excision of lesion of tissue of brain	
A029	Unspecified excision of lesion of tissue of brain	
A068	Other specified other excision of lesion of tissue of brain	
A069	Unspecified other excision of lesion of tissue of brain	
A171	Endoscopic extirpation of lesion of ventricle of brain	
A291	Excision of lesion of optic nerve (II)	
A292	Excision of lesion of oculomotor nerve (III)	
A293	Excision of lesion of trigeminal nerve (V)	
A294	Excision of lesion of facial nerve (VII)	
A295	Excision of lesion of acoustic nerve (VIII)	

CAS-SOP #4: Linking treatment tables

A296	Excision of lesion of glossopharyngeal nerve (IX)
A297	Excision of lesion of vagus nerve (X)
A298	Excision of lesion of specified cranial nerve NEC
A299	Unspecified excision of lesion of cranial nerve
A381	Extirpation of lesion of meninges of cortex of brain
A382	Extirpation of lesion of meninges of sphenoidal ridge of cranium
A383	Extirpation of lesion of meninges of subfrontal region of brain
A384	Extirpation of lesion of meninges of parasagittal region of brain
A385	Extirpation of lesion of falx cerebri
A386	Extirpation of lesion of tentorium cerebelli
A388	Other specified excision of lesion of meninges of brain
A389	Unspecified extirpation of lesion of meninges of brain
A431	Extirpation of lesion of meninges of skull base
A432	Extirpation of lesion of meninges of skull clivus
A438	Other specified other extirpation of lesion of meninges of brain
A439	Unspecified other extirpation of lesion of meninges of brain
A441	Chordectomy of spinal cord
A442	Extirpation of lesion of spinal cord NEC
A443	Excision of lesion of intradural intramedullary spinal cord NEC
A444	Excision of lesion of extradural spinal cord
A445	Excision of lesion of intradural extramedullary spinal cord
A448	Other specified partial extirpation of spinal cord
A449	Unspecified partial extirpation of spinal cord
A511	Extirpation of lesion of meninges of spinal cord
A571	Extirpation of lesion of psinal nerve root
A598	Other specified excision of peripheral nerve
A611	Excision of lesion of peripheral nerve
B012	Trans-spenoidal hypophysectomy
B013	Trans-septal hypophysectomy
B014	Transcranial hypophysectomy
B018	Other specified excision of pituitary gland
B019	Unspecified excision of pituitary gland
B041	Excision of lesion of pituitary gland
B061	Excision of pineal gland
B068	Other specified operations on pineal gland
C021	Excision of lesion of orbit
V051	Extirpation of lesion of cranium
V074	Excision of lesion of infratemporal fossa
V291	Primary laminectomy excision of cervical intervertebral disc
V312	Primary anterolateral excision of thoracic intervertebral disc NEC
V318	Other specified primary excision of thoracic intervertebral disc

CAS-SOP #4: Linking treatment tables

V319	Unspecified primary excision of thoracic intervertebral disc
V331	Primary laminectomy excision of lumbar intervertebral disc
V339	Unspecified primary excision of lumbar intervertebral disc
V351	Primary excision of intervertebral disc NEC
V431	Excision of lesion of cervical vertebra
V432	Excision of lesion of thoracic vertebra
V433	Excision of lesion of lumbar vertebra
V438	Other specified extirpation of lesion of spine
V439	Unspecified extirpation of lesion of spine

Breast (C50)

B271	Total mastectomy and excision of both pectoral muscles and part of chest wall
B272	Total mastectomy and excision of both pectoral muscles NEC
B273	Total mastectomy and excision of pectoralis minor muscle
B274	Total mastectomy NEC
B275	Subcutaneous mastectomy
B276	Skin sparing mastectomy
B278	Other specified total excision of breast
B279	Unspecified total excision of breast
B281	Quadrantectomy of breast
B282	Partial excision of breast NEC
B283	Excision of lesion of breast NEC
B284	Re-excision of breast margins
B285	Wire guided partial excision of breast
B286	Excision of accessory breast tissue
B287	Wire guided excision of lesion of breast
B288	Other specified other excision of breast
B289	Unspecified other excision of breast
B341	Subareolar excision of mammary duct
B342	Excision of lesion of mammary duct
B343	Excision of lesion of mammary duct
B352	Excision of nipple
B353	Extirpation of lesion of nipple
B374	Capsulectomy of breast
B401	Interstitial laser destruction of lesion of breast
B408	Other specified destruction of lesion of breast
B409	Unspecified destruction of lesion of breast

Cervical (C53)

P172	Partial colpectomy
Q011	Amputation of cervix uteri
Q013	Excision of lesion of cervix uteri
Q018	Other specified excision of cervix uteri
Q071	Abdominal hysterocolpectomy and excision of periuterine tissue

CAS-SOP #4: Linking treatment tables

Q072	Abdominal hysterectomy and excision of periuterine tissue NEC	
Q073	Abdominal hysterocolpectomy NEC	
Q074	Total abdominal hysterectomy NEC	
Q078	Other specified abdominal excision of uterus	
Q079	Unspecified abdominal excision of uterus	
Q081	Vaginal hysterocolpectomy and excision of periuterine tissue	
Q082	Vaginal hysterectomy and excision of periuterine tissue NEC	
Q083	Vaginal hysterocolpectomy NEC	
Q088	Other specified vaginal excision of uterus	
Q089	Unspecified vaginal excision of uterus	
X141	Total exenteration of pelvis	
X142	Anterior exenteration of pelvis	
X143	Posterior exenteration of pelvis	
X148	Other specified clearance of pelvis	
X149	Unspecified clearance of pelvis	
Q014	Large loop excision of transformation zone	FIGO stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865)
Q031	Knife cone biopsy of cervix uteri	FIGO stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865)
Q032	Laser cone biopsy of cervix uteri	FIGO stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865)
Q033	Cone biopsy of cervix uteri NEC	FIGO stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865)
T856	Block dissection of pelvic lymph nodes	FIGO stage 1b and 1b1 where also present with a cone biopsy code (Q014, Q031, Q032, Q033)
T859	Unspecified block dissection of lymph nodes	FIGO stage 1b and 1b1 where also present with a cone biopsy code (Q014, Q031, Q032, Q033)
T865	Sampling of mediastinal lymph nodes	FIGO stage 1b and 1b1 where also present with a cone biopsy code (Q014, Q031, Q032, Q033)

Colon and rectum (C18, C19 and C20)

H041	Panproctocolectomy and ileostomy
H042	Panproctocolectomy and anastomosis of ileum to anus and creation of pouch HFQ
H043	Panproctocolectomy and anastomosis of ileum to anus NEC
H048	Other specified total excision of colon and rectum
H049	Unspecified total excision of colon and rectum
H051	Total colectomy and anastomosis of ileum to rectum
H052	Total colectomy and ileostomy and creation of rectal fistula HFQ
H053	Total colectomy and ileostomy NEC
H058	Other specified total excision of colon

CAS-SOP #4: Linking treatment tables

H059	Unspecified total excision of colon
H061	Extended right hemicolectomy and end to end anastomosis
H062	Extended right hemicolectomy and anastomosis of ileum to colon
H063	Extended right hemicolectomy and anastomosis NEC
H064	Extended right hemicolectomy and ileostomy HFQ
H065	Extended right hemicolectomy and end to side anastomosis
H068	Other specified extended excision of right hemicolon
H069	Unspecified extended excision of right hemicolon
H071	Right hemicolectomy and end to end anastomosis of ileum to colon
H072	Right hemicolectomy and side to side anastomosis of ileum to transverse colon
H073	Right hemicolectomy and anastomosis NEC
H074	Right hemicolectomy and ileostomy HFQ
H075	Right hemicolectomy and end to side anastomosis
H078	Other specified other excision of right hemicolon
H079	Unspecified other excision of right hemicolon
H081	Transverse colectomy and end to end anastomosis
H082	Transverse colectomy and anastomosis of ileum to colon
H083	Transverse colectomy and anastomosis NEC
H084	Transverse colectomy and ileostomy HFQ
H085	Transverse colectomy and exteriorisation of bowel NEC
H088	Other specified excision of transverse colon
H089	Unspecified excision of transverse colon
H091	Left hemicolectomy and end to end anastomosis of colon to rectum
H092	Left hemicolectomy and end to end anastomosis of colon to colon
H093	Left hemicolectomy and anastomosis NEC
H094	Left hemicolectomy and ileostomy HFQ
H095	Left hemicolectomy and exteriorisation of bowel NEC
H098	Other specified excision of left hemicolon
H099	Unspecified excision of left hemicolon
H101	Sigmoid colectomy and end to end anastomosis of ileum to rectum
H102	Sigmoid colectomy and anastomosis of colon to rectum
H103	Sigmoid colectomy and anastomosis NEC
H104	Sigmoid colectomy and ileostomy HFQ
H105	Sigmoid colectomy and exteriorisation of bowel NEC
H106	Sigmoid colectomy and end to side anastomosis
H108	Other specified excision of sigmoid colon
H109	Unspecified excision of sigmoid colon
H111	Colectomy and end to end anastomosis of colon to colon NEC

CAS-SOP #4: Linking treatment tables

H112	Colectomy and side to side anastomosis of ileum to colon NEC	
H113	Colectomy and anastomosis NEC	
H114	Colectomy and ileostomy NEC	
H115	Colectomy and exteriorisation of bowel NEC	
H118	Other specified other excision of colon	
H119	Unspecified other excision of colon	
H291	Subtotal excision of colon and rectum and creation of colonic pouch and anastomosis of colon to anus	
H292	Subtotal excision of colon and rectum and creation of colonic pouch NEC	
H293	Subtotal excision of colon and creation of colonic pouch and anastomosis of colon to rectum	
H294	Subtotal excision of colon and creation of colonic pouch NEC	
H298	Other specified subtotal excision of colon	
H299	Unspecified subtotal excision of colon	
H322	Hartmann procedure (rectosigmoidectomy)	
H331	Abdominoperineal excision of rectum and end colostomy	
H332	Proctectomy and anastomosis of colon to anus	
H333	Anterior resection of rectum and anastomosis of colon to rectum using staples	
H334	Anterior resection of rectum and anastomosis NEC	
H335	Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel	
H336	Anterior resection of rectum and exteriorisation of bowel	
H337	Perineal resection of rectum HFQ	
H338	Other specified excision of rectum	
H339	Unspecified excision of rectum	
H404	Trans-sphincteric anastomosis of colon to anus	
H408	Other specified operations on rectum through anal sphincter	
H409	Unspecified operations on rectum through anal sphincter	
X141	Total exenteration of pelvis	
X142	Anterior exenteration of pelvis	
X143	Posterior exenteration of pelvis	
X148	Other specified clearance of pelvis	
X149	Unspecified clearance of pelvis	
H122	Excision of lesion of colon NEC	Stage 1 only
H181	Open colonoscopy	Stage 1 only
H191	Open biopsy of lesion of colon	Stage 1 only
H201	Fibreoptic endoscopic snare resection of lesion of colon	Stage 1 only
H202	Fibreoptic endoscopic cauterisation of lesion of colon	Stage 1 only
H204	Fibreoptic endoscopic destruction of lesion of colon NEC	Stage 1 only
H205	Fibreoptic endoscopic submucosal resection of lesion of colon	Stage 1 only
H206	Fibreoptic endoscopic resection of lesion of colon NEC	Stage 1 only

CAS-SOP #4: Linking treatment tables

H208	Other specified endoscopic extirpation of lesion of colon	Stage 1 only
H209	Unspecified endoscopic extirpation of lesion of colon	Stage 1 only
H221	Diagnostic fibreoptic endoscopic examination of colon and biopsy of lesion of colon	Stage 1 only
H229	Undpecified diagnostic endoscopic examination of colon	Stage 1 only
H231	Endoscopic snare resection of lesion of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H232	Endoscopic cauterisation of lesion of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H235	Endoscopic submucosal resection of lesion of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H236	Endoscopic resection of lesion of lower bowel using fibreoptic sigmoidoscope NEC	Stage 1 only
H238	Other specified endoscopic extirpation of lesion of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H239	Unspecified endoscopic extirpation of lesion of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H248	Other specified other therapeutic endoscopic operations on lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H251	Diagnostic endoscopic examination of lower bowel and biopsy of lesion of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H259	Unspecified diagnostic endoscopic examination of lower bowel using fibreoptic sigmoidoscope	Stage 1 only
H261	Endoscopic snare resection of lesion of sigmoid colon using rigid sigmoidoscope	Stage 1 only
H281	Diagnostic endoscopic examination of sigmoid colon and biopsy of lesion of sigmoid colon using rigid sigmoidoscope	Stage 1 only
H341	Open excision of lesion of rectum	Stage 1 only
H402	Trans-sphincteric excision of lesion of rectum	Stage 1 only
H412	Peranal excision of lesion of rectum	Stage 1 only
H418	Other specified other operations on rectum through anus	Stage 1 only
H419	Unspecified other operations on rectum through anus	Stage 1 only
H561	Biopsy of lesion of anus	Stage 1 only
H024	Incidental appendectomy	C18.1 (appendix tumours) only
H019	Unspecified emergency excision of appendix	C18.1 (appendix tumours) only
H011	Emergency excision of abnormal appendix and drainage HFQ	C18.1 (appendix tumours) only

Head and neck (C01, C02, C03, C04, C05, C06, C07, C08, C09, C10, C11, C12, C13, C14, C30, C31, C32)

E191	Total pharyngectomy
E192	Partial pharyngectomy
E214	Plastic repair of pharynx NEC
E231	Open excision of lesion of pharynx
E242	Endoscopic extirpation of lesion of pharynx NEC
E291	Total laryngectomy
E292	Partial horizontal laryngectomy
E293	Partial vertical laryngectomy

CAS-SOP #4: Linking treatment tables

E294	Partial laryngectomy NEC	
E295	Laryngofissure and chordectomy of vocal chord	
E296	Laryngectomy NEC	
E299	Unspecified excision of larynx	
E301	Excision of lesion of larynx using thyrotomy as approach	
E341	Microtherapeutic endoscopic extirpation of lesion of larynx using laser	
E342	Microtherapeutic endoscopic resection of lesion of larynx NEC	
E343	Microtherapeutic endoscopic destruction of lesion of larynx NEC	
E352	Endoscopic resection of lesion of pharynx NEC	
E414	Tracheo-oesophageal puncture with insertion of speech prothesis	
F011	Excision of vermilion border of lip and advancement of mucosa of lip	
F018	Other specified partial excision of lip	
F021	Excision of lesion of lip	
F042	Reconstruction of lip using skin flap	
F202	Excision of lesion of gingiva	
F221	Total glossectomy	
F222	Partial glossectomy	
F231	Excision of lesion of tongue	
F281	Excision of lesion of palate	
F301	Plastic repair of palate using flap of palate	
F303	Plastic repair of palate using flap of tongue	
F304	Plastic repair of palate using graft of skin	
F305	Plastic repair of palate using flap of mucosa	
F324	Operations on uvula NEC	
F328	Other specified other operations on palate	
F341	Bilateral dissection tonsillectomy	Tonsil tumours (C09) only
F349	Unspecified excision of tonsil	
F381	Excision of lesion of floor of mouth	
F382	Excision of lesion of mouth NEC	
F391	Reconstruction of mouth using flap NEC	
F392	Reconstruction of mouth using graft NEC	
F441	Total excision of parotid gland	
F442	Partial excision of parotid gland	
F443	Excision of parotid gland NEC	
F444	Excision of submandibular gland	
F451	Excision of lesion of parotid gland	
G021	Total oesophagectomy and anastomosis of pharynx to stomach	
G032	Partial oesophagectomy and interposition of microvascularly attached jejunum	
S171	Distant myocutaneous subcutaneous pedicle flap to head or neck	
S208	Other specified other distant flap of skin	
S248	Other specified local flap of skin and muscle	

CAS-SOP #4: Linking treatment tables

S288	Other specified flap of mucosa
S353	Split autograft of skin to head or neck NEC
T851	Block dissection of cervical lymph nodes
V061	Medial maxillectomy
V068	Other specified excision of maxilla
V069	Unspecified excision of maxilla
V141	Hemimandibulectomy
V142	Extensive excision of mandible NEC
V143	Partial excision of mandible NEC
V144	Excision of lesion of mandible
V149	Unspecified excision of mandible
V168	Other specified division of mandible
V191	Reconstruction of mandible
Y051	Total excision of organ NOC
Y592	Harvest of radial artery flap of skin and fascia
Y598	Other specified harvest of flap of skin and fascia
Y612	Harvest of flap of skin and pectoralis major muscle
Y631	Harvest of flap of latissimus dorsi muscle NEC
Y638	Other specified harvest of flap of muscle of trunk
Y662	Harvest of bone from rib

Kidney (C64-C66, C68)

M021	Nephrectomy and excision of perirenal tissue	
M022	Nephroureterectomy NEC	
M023	Bilateral nephrectomy	
M024	Excision of half of horseshoe kidney	
M025	Nephrectomy NEC	
M028	Other specified total excision of kidney	
M029	Unspecified total excision of kidney	
M038	Other specified partial excision of kidney	
M039	Unspecified partial excision of kidney	
M042	Open excision of lesion of kidney NEC	
M104	Endoscopic cryoablation of lesion of kidney	
M137	Percutaneous radiofrequency ablation of lesion of kidney	
M181	Total ureterectomy	
M182	Excision of segment of ureter	
M183	Secondary ureterectomy	
M252	Open excision of lesion of ureter NEC	
M291	Endoscopic extirpation of lesion of ureter	Tumours of ureter (C66) & pelvis (C65) only
Y112	Cryotherapy to organ NOC	

Liver (C22)

J011	Orthotopic transplantation of liver NEC
J015	Orthotopic transplantation of whole liver

CAS-SOP #4: Linking treatment tables

J019	Unspecified transplantation of liver	
J021	Right hemihepatectomy NEC	
J022	Left hemihepatectomy NEC	
J023	Resection of segment of liver	
J024	Wedge excision of liver	
J026	Extended right hemihepatectomy	
J027	Extended left hemihepatectomy	
J028	Other specified partial excision of liver	
J029	Unspecified partial excision of liver	
J031	Excision of lesion of liver NEC	
J053	Open wedge biopsy of lesion of liver	
J101	Percutaneous transluminal embolisation of hepatic artery	
J124	Percutaneous radiofrequency ablation of lesion of liver	Stage 1 only
J127	Percutaneous microwave ablation of lesion of liver	Stage 1 only

Small cell lung cancer (SCLC) and Non small cell lung cancer (NSCLC) (C33-C34)

E391	Open excision of lesion of trachea
E398	Other specified partial excision of trachea
E399	Unspecified partial excision of trachea
E441	Excision of carina
E461	Sleeve resection of bronchus and anastomosis HFQ
E541	Total pneumonectomy
E542	Bilobectomy of lung
E543	Lobectomy of lung
E544	Excision of segment of lung
E545	Partial lobectomy of lung NEC
E548	Other specified excision of lung
E549	Unspecified excision of lung
E552	Open excision of lesion of lung
E554	Open destruction of lesion of lung NEC
E559	Unspecified open extirpation of lesion of lung
T013	Excision of lesion of chest wall
T023	Insertion of prosthesis into chest wall NEC

Oesophagus (C15)

G011	Oesophagogastrectomy and anastomosis of oesophagus to stomach
G013	Oesophagogastrectomy and anastomosis of oesophagus to jejunum NEC
G018	Other specified excision of oesophagus and stomach
G019	Unspecified excision of oesophagus and stomach
G021	Total oesophagectomy and anastomosis of pharynx to stomach
G022	Total oesophagectomy and interposition of microvascularly attached jejunum

CAS-SOP #4: Linking treatment tables

G023	Total oesophagectomy and interposition of jejunum NEC	
G024	Total oesophagectomy and interposition of microvascularly attached colon	
G025	Total oesophagectomy and interposition of colon NEC	
G028	Other specified total excision of oesophagus	
G029	Unspecified total excision of oesophagus	
G031	Partial oesophagectomy and end to end anastomosis of oesophagus	
G032	Partial oesophagectomy and interposition of microvascularly attached jejunum	
G033	Partial oesophagectomy and anastomosis of oesophagus to transposed jejunum	
G034	Partial oesophagectomy and anastomosis of oesophagus to jejunum NEC	
G035	Partial oesophagectomy and interposition of microvascularly attached colon	
G036	Partial oesophagectomy and interposition of colon NEC	
G038	Other specified partial excision of oesophagus	
G039	Unspecified partial excision of oesophagus	
G146	Fibreoptic endoscopic submucosal resection of lesion of oesophagus	Stage 1a disease only
G171	Endoscopic snare resection of lesion of oesophagus using rigid oesophagoscope	Stage 1a disease only
G271	Total gastrectomy and excision of surrounding tissue	
G274	Total gastrectomy and anastomosis of oesophagus to transposed jejunum	
G275	Total gastrectomy and anastomosis of oesophagus to jejunum NEC	
G279	Unspecified total excision of stomach	
G421	Fibreoptic endoscopic submucosal resection of lesion of upper gastrointestinal tract	Stage 1a disease only
G431	Fibreoptic endoscopic snare resection of lesion of upper gastrointestinal tract	Stage 1a disease only
G438	Other specified fibreoptic endoscopic extirpation of lesion of upper gastrointestinal tract	Stage 1a disease only

Ovarian (C56-C57, and selected C48 tumours)

H331	Abdominoperineal excision of rectum and end colostomy
H332	Proctectomy and anastomosis of colon to anus
H333	Anterior resection of rectum and anastomosis of colon to rectum using staples
H334	Anterior resection of rectum and anastomosis NEC
H335	Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel
H336	Anterior resection of rectum and exteriorisation of bowel
H337	Perineal resection of rectum HFQ
H338	Other specified excision of rectum
H339	Unspecified excision of rectum
Q071	Abdominal hysterocolpectomy and excision of periuterine tissue
Q072	Abdominal hysterectomy and excision of periuterine tissue NEC
Q073	Abdominal hysterocolpectomy NEC
Q074	Total abdominal hysterectomy NEC

CAS-SOP #4: Linking treatment tables

Q075	Subtotal abdominal hysterectomy
Q078	Other specified abdominal excision of uterus
Q079	Unspecified abdominal excision of uterus
Q081	Vaginal hysterocolpectomy and excision of periuterine tissue
Q082	Vaginal hysterectomy and excision of periuterine tissue NEC
Q083	Vaginal hysterocolpectomy NEC
Q088	Other specified vaginal excision of uterus
Q089	Unspecified vaginal excision of uterus
Q221	Bilateral salpingoophorectomy
Q223	Bilateral oophorectomy NEC
Q231	Unilateral salpingoophorectomy NEC
Q232	Salpingoophorectomy of remaining solitary fallopian tube and ovary
Q235	Unilateral oophorectomy NEC
Q236	Oophorectomy of remaining solitary ovary NEC
Q241	Salpingoophorectomy NEC
Q243	Oophorectomy NEC
Q438	Other specified partial excision of ovary
Q439	Unspecified partial excision of ovary
Q473	Open biopsy of lesion of ovary
Q478	Other specified other open operations on ovary
Q491	Endoscopic extirpation of lesion of ovary NEC
T331	Open excision of lesion of peritoneum
T332	Open destruction of lesion of peritoneum
T338	Other specified open extirpation of lesion of peritoneum
T339	Unspecified open extirpation of lesion of peritoneum
T361	Omentectomy
T362	Excision of lesion of omentum
X141	Total exenteration of pelvis
X142	Anterior exenteration of pelvis
X143	Posterior exenteration of pelvis
X148	Other specified clearance of pelvis
X149	Unspecified clearance of pelvis

Pancreas (C25)

J551	Total pancreatectomy and excision of surrounding tissue
J552	Total pancreatectomy NEC
J558	Other specified total excision of pancreas
J559	Unspecified total excision of pancreas
J561	Pancreaticoduodenectomy and excision of surrounding tissue
J562	Pancreaticoduodenectomy and resection of antrum of stomach
J563	Pancreaticoduodenectomy NEC
J568	Other specified excision of head of pancreas
J569	Unspecified excision of head of pancreas
J571	Subtotal pancreatectomy
J573	Left pancreatectomy NEC
J574	Excision of tail of pancreas and drainage of pancreatic duct

CAS-SOP #4: Linking treatment tables

J575	Excision of tail of pancreas NEC
J578	Other specified other partial excision of pancreas
J579	Unspecified other partial excision of pancreas
J582	Excision of lesion of pancreas NEC

Prostate (C61)

M341	Cystoprostatectomy
M611	Total excision of prostate and capsule of prostate
M614	Perineal prostatectomy
M618	Other specified open excision of prostate
M619	Unspecified open excision of prostate
M671	Endoscopic cryotherapy to lesion of prostate
M711	High intensity focused ultrasound of prostate
X141	Total exenteration of pelvis

Skin (C43, C44)

B279	Unspecified total excision of breast	
B283	Excision of lesion of breast NEC	
B284	Re-excision of breast margins	
C011	Exenteration of orbit	
C012	Enucleation of eye	
C013	Evisceration of eye	
C018	Other specified excision of eye	
C019	Unspecified excision of eye	
C021	Excision of lesion of orbit	
C022	Destruction of lesion of orbit	
C028	Other specified extirpation of lesion of orbit	
C029	Unspecified extirpation of lesion of orbit	
C101	Excision of lesion of eyebrow	
C102	Hair bearing flap to eyebrow	
C103	Hair bearing graft to eyebrow	
C111	Excision of lesion of canthus	
C115	Graft of skin to canthus	
C121	Excision of lesion of eyelid NEC	
C124	Curettage of lesion of eyelid	BCC and cSCC tumours only
C126	Wedge excision of lesion of eyelid	
C141	Flap of skin to eyelid	
C142	Graft of skin to eyelid	
C143	Graft of cartilage to eyelid	
C144	Graft of skin and fat to eyelid	
C145	Graft of fascia to eyelid	
C148	Other specified reconstruction of eyelid	
C149	Unspecified reconstruction of eyelid	
C162	Lateral tarsorrhaphy	

CAS-SOP #4: Linking treatment tables

C164	Tarsorrhaphy NEC	
C168	Other specified other plastic repair of eyelid	
C178	Other specified other repair of eyelid	
C179	Unspecified other repair of eyelid	
D011	Total excision of external ear	
D012	Partial excision of external ear	
D013	Excision of preauricular abnormality	
D018	Other specified excision of external ear	
D019	Unspecified excision of external ear	
D021	Excision of lesion of external ear	
D028	Other specified extirpation of lesion of external ear	
D031	Reconstruction of external ear using graft	
D032	Reconstruction of external ear NEC	
D064	Graft of skin to external ear	
D065	Flap of skin to external ear	
E011	Total excision of nose	
E018	Other specified excision of nose	
E019	Unspecified excision of nose	
E021	Total reconstruction of nose	
E022	Reconstruction of nose NEC	
E023	Septorhinoplasty using implant	
E024	Septorhinoplasty using graft	
E025	Reduction rhinoplasty	
E026	Rhinoplasty NEC	
E027	Alar reconstruction with cartilage graft	
E028	Other specified plastic operations on nose	
E029	Unspecified plastic operations on nose	
E037	Septal reconstruction with cartilage graft	
E091	Excision of lesion of external nose	
E094	Shave of skin of nose	BCC and cSCC tumours only
F011	Excision of vermilion border of lip and advancement of mucosa of lip	
F018	Other specified partial excision of lip	
F019	Unspecified partial excision of lip	
F021	Excision of lesion of lip	
F029	Unspecified extirpation of lesion of lip	
F041	Reconstruction of lip using tongue flap	
F042	Reconstruction of lip using skin flap	
F048	Other specified other reconstruction of lip	
F049	Unspecified other reconstruction of lip	
F441	Total excision of parotid gland	
F442	Partial excision of parotid gland	
F443	Excision of parotid gland NEC	
F444	Excision of submandibular gland	
F445	Excision of sublingual gland	
F448	Other specified excision of salivary gland	
F449	Unspecified excision of salivary gland	

CAS-SOP #4: Linking treatment tables

F451	Excision of lesion of parotid gland	
F452	Excision of lesion of submandibular gland	
N012	Excision of lesion of scrotum	
N271	Excision of lesion of penis	
P111	Excision of lesion of female perineum	
S018	Other specified plastic excision of skin of head or neck	
S019	Unspecified plastic excision of skin of head or neck	
S028	Other specified plastic excision of skin of abdominal wall	
S029	Unspecified plastic excision of skin of abdominal wall	
S038	Other specified plastic excision of skin of other site	
S039	Unspecified plastic excision of skin of other site	
S041	Excision of sweat gland bearing skin of axilla	
S042	Excision of sweat gland bearing skin of groin	
S043	Excision of sweat gland bearing skin NEC	
S048	Other specified other excision of skin	
S049	Unspecified other excision of skin	
S051	Microscopically controlled excision of lesion of skin of head or neck using fresh tissue technique	
S052	Microscopically controlled excision of lesion of skin using fresh tissue technique NEC	
S053	Microscopically controlled excision of lesion of skin of head or neck using chemosurgical technique	
S054	Microscopically controlled excision of lesion of skin using chemosurgical technique NEC	
S055	Microscopically controlled excision of lesion of skin of head or neck NEC	
S058	Other specified microscopically controlled excision of lesion of skin	
S059	Unspecified microscopically controlled excision of lesion of skin	
S063	Shave excision of lesion of skin of head or neck	
S064	Shave excision of lesion of skin NEC	
S065	Excision of lesion of skin of head or neck NEC	
S066	Re-excision of skin margins of head or neck	
S067	Re-excision of skin margins NEC	
S068	Other specified other excision of lesion of skin	
S069	Unspecified other excision of lesion of skin	
S081	Curettage and cauterisation of lesion of skin of head or neck	BCC and cSCC tumours only
S082	Curettage and cauterisation of lesion of skin NEC	BCC and cSCC tumours only
S083	Curettage of lesion of skin of head or neck NEC	BCC and cSCC tumours only
S088	Other specified curettage of lesion of skin	BCC and cSCC tumours only
S089	Unspecified curettage of lesion of skin	BCC and cSCC tumours only
S143	Shaved deep ellipse biopsy of lesion of skin of head or neck	BCC and cSCC tumours only
S144	Shaved deep ellipse biopsy of lesion of skin NEC	BCC and cSCC tumours only
S171	Distant myocutaneous subcutaneous pedicle flap to head or neck	
S172	Distant myocutaneous subcutaneous pedicle flap NEC	

CAS-SOP #4: Linking treatment tables

S173	Distant myocutaneous flap to head or neck NEC
S174	Distant myocutaneous free flap to head or neck
S175	Distant myocutaneous free flap NEC
S178	Other specified distant flap of skin and muscle
S179	Unspecified distant flap of skin and muscle
S181	Distant fasciocutaneous subcutaneous pedicle flap to head or neck
S182	Distant fasciocutaneous subcutaneous pedicle flap NEC
S183	Distant fasciocutaneous flap to head or neck NEC
S184	Distant fasciocutaneous free flap to head or neck
S185	Distant fasciocutaneous free flap NEC
S188	Other specified distant flap of skin and fascia
S189	Unspecified distant flap of skin and fascia
S191	Distant tube pedicle flap of skin to head or neck
S192	Distant tube pedicle flap of skin NEC
S198	Other specified distant pedicle flap of skin
S199	Unspecified distant pedicle flap of skin
S201	Axial pattern distant flap of skin to head or neck
S202	Axial pattern distant flap of skin NEC
S203	Random pattern distant flap of skin to head or neck
S204	Random pattern distant flap of skin NEC
S205	Distant flap of skin to head or neck NEC
S206	Distant free flap of skin to head or neck NEC
S207	Distant free flap of skin NEC
S208	Other specified other distant flap of skin
S209	Unspecified other distant flap of skin
S211	Hair bearing flap of skin to scalp for male pattern baldness
S212	Hair bearing flap of skin to scalp NEC
S213	Hair bearing flap of skin to nasolabial area
S214	Hair bearing flap of skin to chin area
S218	Other specified hair bearing flap of skin
S219	Unspecified hair bearing flap of skin
S221	Neurovascular island sensory flap of skin to head or neck
S222	Neurovascular island sensory flap of skin NEC
S223	Local sensory flap of skin to head or neck
S224	Local sensory flap of skin NEC
S228	Other specified sensory flap of skin
S229	Unspecified sensory flap of skin
S231	Z plasty to head or neck
S232	Z plasty NEC
S233	W plasty to head or neck
S234	W plasty NEC
S238	Other specified flap operations to relax contracture of skin
S239	Unspecified flap operations to relax contracture of skin

CAS-SOP #4: Linking treatment tables

S241	Local myocutaneous subcutaneous pedicle flap to head or neck
S242	Local myocutaneous subcutaneous pedicle flap NEC
S243	Local myocutaneous flap to head or neck NEC
S248	Other specified local flap of skin and muscle
S249	Unspecified local flap of skin and muscle
S251	Local fasciocutaneous subcutaneous pedicle flap to head or neck
S252	Local fasciocutaneous subcutaneous pedicle flap NEC
S253	Local fasciocutaneous flap to head or neck nec
S258	Other specified local flap of skin and fascia
S259	Unspecified local flap of skin and fascia
S261	Axial pattern local subcutaneous pedicle flap of skin to head or neck
S262	Axial pattern local subcutaneous pedicle flap of skin NEC
S263	Random pattern local subcutaneous pedicle flap of skin to head or neck
S264	Random pattern local subcutaneous pedicle flap of skin NEC
S265	Local subcutaneous pedicle flap of skin to head or neck NEC
S268	Other specified local subcutaneous pedicle flap of skin
S269	Unspecified local subcutaneous pedicle flap of skin
S271	Axial pattern local flap of skin to head or neck NEC
S272	Axial pattern local flap of skin NEC
S273	Random pattern local flap of skin to head or neck NEC
S274	Random pattern local flap of skin NEC
S275	Local flap of skin to head or neck NEC
S278	Other specified other local flap of skin
S279	Unspecified other local flap of skin
S291	Distant osteocutaneous pedicle flap to head or neck
S292	Distant osteocutaneous pedicle flap NEC
S293	Distant osteocutaneous flap to head or neck NEC
S294	Distant osteocutaneous free flap to head or neck
S295	Distant osteocutaneous free flap NEC
S298	Other specified distant flap of skin and bone
S299	Unspecified distant flap of skin and bone
S302	Transfer of flap of skin to head or neck
S314	Final inset of flap of skin NEC
S321	Distant osteomusculocutaneous pedicle flap of head or neck
S322	Distant osteomusculocutaneous pedicle flap NEC
S323	Distant osteomusculocutaneous flap to head or neck NEC
S324	Distant osteomusculocutaneous free flap to head or neck
S325	Distant osteomusculocutaneous free flap NEC

CAS-SOP #4: Linking treatment tables

S328	Other specified distant flap of skin and multiple tissues
S329	Unspecified distant flap of skin and multiple tissues
S338	Other specified hair bearing graft of skin to scalp
S339	Unspecified hair bearing graft of skin to scalp
S348	Other specified hair bearing graft of skin to other site
S351	Meshed split autograft of skin to head or neck
S352	Meshed split autograft of skin NEC
S353	Split autograft of skin to head or neck NEC
S358	Other specified split autograft of skin
S359	Unspecified split autograft of skin
S361	Full thickness autograft of skin to head or neck
S362	Full thickness autograft of skin NEC
S363	Composite autograft of skin to head or neck
S364	Composite autograft of skin NEC
S365	Pinch graft of skin to head or neck
S366	Pinch graft of skin NEC
S368	Other specified other autograft of skin
S369	Unspecified other autograft of skin
S371	Allograft of skin to head or neck
S372	Allograft of skin NEC
S373	Xenograft of skin to head or neck
S374	Xenograft of skin NEC
S378	Other specified other graft of skin
S379	Unspecified other graft of skin
S391	Allograft of amniotic membrane to head or neck
S392	Allograft of amniotic membrane NEC
S398	Other specified graft of other tissue to skin
S399	Unspecified graft of other tissue to skin
S641	Excision of nail bed
T013	Excision of lesion of chest wall
T313	Excision of lesion of anterior abdominal wall NEC
T851	Block dissection of cervical lymph nodes
T852	Block dissection of axillary lymph nodes
T853	Block dissection of mediastinal lymph nodes
T854	Block dissection of para-aortic lymph nodes
T855	Block dissection of inguinal lymph nodes
T856	Block dissection of pelvic lymph nodes
T858	Other specified block dissection of lymph nodes
T859	Unspecified block dissection of lymph nodes
T911	Biopsy of sentinel lymph node NEC
T962	Excision of lesion of soft tissue NEC
X071	Forequarter amputation
X072	Disarticulation of shoulder
X073	Amputation of arm above elbow
X074	Amputation of arm through elbow

CAS-SOP #4: Linking treatment tables

X075	Amputation of arm through forearm
X078	Other specified amputation of arm
X079	Unspecified amputation of arm
X081	Amputation of hand at wrist
X082	Amputation of thumb
X083	Amputation of phalanx of finger
X084	Amputation of finger NEC
X088	Other specified amputation of hand
X089	Unspecified amputation of hand
X091	Hindquarter amputation
X092	Disarticulation of hip
X093	Amputation of leg above knee
X094	Amputation of leg through knee
X095	Amputation of leg below knee
X098	Other specified amputation of leg
X099	Unspecified amputation of leg
X101	Amputation of foot through ankle
X102	Disarticulation of tarsal bones
X103	Disarticulation of metatarsal bones
X104	Amputation through metatarsal bones
X108	Other specified amputation of foot
X109	Unspecified amputation of foot
X111	Amputation of great toe
X112	Amputation of phalanx of toe
X118	Other specified amputation of toe
X119	Unspecified amputation of toe
X121	Reamputation at higher level
X122	Excision of lesion of amputation stump
X123	Shortening of length of amputation stump
X124	Revision of coverage of amputation stump
X125	Drainage of amputation stump
X128	Other specified operations on amputation stump
X129	Unspecified operations on amputation stump

Stomach (C16)

G011	Oesophagogastrectomy and anastomosis of oesophagus to stomach
G012	Oesophagogastrectomy and anastomosis of oesophagus to transposed jejunum
G013	Oesophagogastrectomy and anastomosis of oesophagus to jejunum NEC
G039	Unspecified partial excision of oesophagus
G271	Total gastrectomy and excision of surrounding tissue
G272	Total gastrectomy and anastomosis of oesophagus to duodenum
G273	Total gastrectomy and interposition of jejunum
G274	Total gastrectomy and anastomosis of oesophagus to transposed jejunum

CAS-SOP #4: Linking treatment tables

G275	Total gastrectomy and anastomosis of oesophagus to jejunum NEC	
G278	Other specified total excision of stomach	
G279	Unspecified total excision of stomach	
G281	Partial gastrectomy and anastomosis of stomach to duodenum	
G282	Partial gastrectomy and anastomosis of stomach to transposed jejunum	
G283	Partial gastrectomy and anastomosis of stomach to jejunum NEC	
G288	Other specified partial excision of stomach	
G289	Unspecified partial excision of stomach	
G421	Fibreoptic endoscopic submucosal resection of lesion of upper gastrointestinal tract	Stage 1a disease only
G146	Fibreoptic endoscopic submucosal resection of lesion of oesophagus	Stage 1a disease only
G449	Unspecified other therapeutic fibreoptic endoscopic operations on upper gastrointestinal tract	Stage 1a disease only

Testis (C62, D292)

N051	Bilateral Subcapsular Orchidectomy
N052	Bilateral Orchidectomy NEC, Ablation Of Testes
N053	Bilateral Inguinal Orchidectomy
N061	Subcapsular Orchidectomy NEC
N063	Orchidectomy NEC
N066	Inguinal Orchidectomy NEC
N068	Other Specified Other Excision Of Testis
N069	Unspecified Other Excision Of Testis
N072	Destruction Of Lesion Of Testis
N078	Other Specified Extirpation Of Lesion Of Testis
N079	Unspecified Extirpation Of Lesion Of Testis
X163	Excision Of Gonad From Abdomen
X164	Excision Of Gonad From Pelvis
X165	Excision Of Gonad From Inguinal Canal
X166	Excision Of Gonad Nec

Uterine (C54-C55)

Q071	Abdominal hysterocolpectomy and excision of periuterine tissue
Q072	Abdominal hysterectomy and excision of periuterine tissue NEC
Q073	Abdominal hysterocolpectomy NEC
Q074	Total abdominal hysterectomy NEC
Q075	Subtotal abdominal hysterectomy
Q078	Other specified abdominal excision of uterus
Q079	Unspecified abdominal excision of uterus
Q081	Vaginal hysterocolpectomy and excision of periuterine tissue
Q082	Vaginal hysterectomy and excision of periuterine tissue NEC
Q083	Vaginal hysterocolpectomy NEC
Q088	Other specified vaginal excision of uterus
Q089	Unspecified vaginal excision of uterus
Q093	Open excision of lesion of uterus NEC
Q161	Vaginal excision of lesion of uterus

CAS-SOP #4: Linking treatment tables

Q221	Bilateral salpingoophorectomy
Q222	Bilateral salpingectomy NEC
Q223	Bilateral oophorectomy NEC
Q228	Other specified bilateral excision of adnexa of uterus
Q229	Unspecified bilateral excision of adnexa of uterus
Q231	Unilateral salpingoophorectomy NEC
Q232	Salpingoophorectomy of remaining solitary fallopian tube and ovary
Q235	Unilateral oophorectomy NEC
Q236	Oophorectomy of remaining solitary ovary NEC
Q238	Other specified unilateral excision of adnexa of uterus
Q239	Unspecified unilateral excision of adnexa of uterus
Q521	Excision of lesion of broad ligament of uterus
X141	Total exenteration of pelvis
X142	Anterior exenteration of pelvis
X143	Posterior exenteration of pelvis
X148	Other specified clearance of pelvis
X149	Unspecified clearance of pelvis

Vulva (C51)

P011	Clitoridectomy
P033	Excision of lesion of bartholin gland
P051	Total excision of vulva
P052	Partial excision of vulva
P054	Excision of lesion of vulva NEC
P058	Other specified excision of vulva
P059	Unspecified excision of vulva
P111	Excision of lesion of female perineum

Appendix 4: Example code

--The code presented below was used to generate the AV2018.AV_TREATMENT_1318_4P6 table and should be used to identify treatments for cancers diagnosed in 2013-2018.

--There are also minor corrections to the code, so it supersedes the code published in both SOP version 4.2 for 2013-2014 diagnoses, 4.4 for 2013-2015 diagnoses (shared via NCRAS website), and 4.5 for 2013-2016 diagnoses..

-----User notes:-----

-- This is the SQL to generate treatment flags (resection, chemo, radio) for 2013-18 diagnoses, including demographic & geographies breakdown

--It creates an extract to be used both in the unadjusted treatment rates workbook.

--It uses these tables in casref01:

--analysislouisereynolds.opcs4resection_lookup_13_16@casref01

--analysislouisereynolds.timeframe_lookup_13_18@casref01

--1. Set your connection to casref01

--2. Create each table in turn in the SQL, starting with your cohort of interest.

--If limiting the cohort, do this in the first table (tr_tumour_cohort_d)

--3. Then the last table brings all the previous ones together into your final export.

--4. After you run each new table, you need to index it and create database stats - this optimises performance.

--This is included throughout using the create index and execute commands

--You only need to create the database stats if you are creating and using that table the same day (otherwise they are automatically generated overnight)

--You will need to change analysislouisereynolds to your username

--If, after creating and indexing the tables, you need to rerun any, it may be more efficient to truncate the table than drop and create it again, e.g.:

--Truncate table tr_tumour_cohort;

--insert into tr_tumour_cohort_d (

--5. Alternatively you can use the final table we have already created here:

--***analysislouisereynolds.av_treatment_table_1318_4p6@casref01***

--6. If analysing in stata, you can use the code below to collapse the data down so it's not identifiable (example below groups by stage, cancer type & diagnosis year)

--collapse (count) tumourid, by (cancergroup stage_group rt_flag ct_flag SG_flag diagnosisyear)

----- CREATE TUMOUR COHORT TABLE -----

 CREATE TABLE tr_tumour_cohort AS

-- Non-melanoma (C44) skin cancers need to be selected separately to the rest of the tumour cohort. The cohorts will then be unioned together.

WITH tr_nmsc_cohort AS

(
 SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2, tumour_flag, figo, sex, ethnicity, morph_icd10_o2, fiveyearageband, age, diagnosisyear, dedup_flag, site_icd10_o2_3char, ctry_code, statusofregistration

FROM (

SELECT avt.tumourid, avt.patientid, avt.nhsnumber, avt.diagnosisdatebest, avt.site_icd10_o2, avt.figo, avt.sex, avt.ethnicity, avt.morph_icd10_o2, avt.fiveyearageband, avt.age, avt.diagnosisyear, avt.dedup_flag, avt.site_icd10_o2_3char, avt.ctry_code, avt.statusofregistration

--Adds NMSC cancer type to tumour_code

, CASE WHEN avt.morph_icd10_o2 IN ('8050', '8051', '8052', '8054', '8070', '8071', '8072', '8073', '8074', '8075', '8076', '8077', '8078', '8082', '8083', '8084', '8085', '8086') THEN 'C44CSCC'

WHEN avt.morph_icd10_o2 IN ('8090', '8091', '8092', '8093', '8094', '8095', '8097') THEN 'C44BCC'

ELSE 'C44OTHER' END AS tumour_code,

-- This join flags any tumours diagnosed in 2013-18 that belong to a patient who had another tumour in the 18 months before or after that diagnosis

--(so that later, patient level datasets (HES, SACT, RTDS) are only used for patients with 1 tumour)

-- Tumour_flag = 1; the tumour belonged to a patient who had another tumour within 18 months

CASE WHEN ABS(avt.diagnosisdatebest-avt2.diagnosisdatebest)<548 THEN 1 ELSE 0 END AS tumour_flag

-- In the process of joining AVT2 to AVT to identify multiple tumours, duplicate rows are generated

-- The difference between diagnosis date for tumours in AVT and AVT2 ranks multiple tumours where more than one exists and drops all but the closest tumour to the original tumour.

-- Where RK = 1; this is the tumour record to keep

,RANK() OVER (PARTITION BY avt.tumourid ORDER BY ABS(avt.diagnosisdatebest-avt2.diagnosisdatebest) ASC, avt2.tumourid) AS rk

FROM av2018.at_tumour_england@casref01 avt

-- Multiple tumours join:

-- For tumours diagnosed from 2013-2018, identify any other tumour IDs that occurred between 2011-2019

-- A second copy of the tumour cohort (AVT2) is joined to the original tumour cohort of 2013-18 diagnoses (AVT)

-- Records from AVT2 are only joined if the patient ID is the same but the tumour ID is different

CAS-SOP #4: Linking treatment tables

```
LEFT JOIN av2018.at_tumour_england@casref01 AVT2 ON avt.patientid=avt2.patientid
AND NOT(avt.tumourid=avt2.tumourid)
AND avt2.site_icd10_o2_3char NOT IN
('D01','D03','D04','D06','D07','D11','D13','D15','D16','D18','D25','D27','D36','D40','D48')
AND avt2.diagnosisyear BETWEEN 2011 AND 2020
--Define cohort of interest here
WHERE avt.site_icd10_o2_3char='C44'
AND avt.ctry_code='E'
AND avt.statusofregistration='F'
AND avt.dedup_flag=1
AND avt.age between 0 and 200
and avt.sex in (1,2)

)WHERE rk=1),

c44_cohort AS
(
--select first ever BCC per patient all time only
SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2, tumour_flag,
sex, ethnicity, morph_icd10_o2, fiveyearageband, age, diagnosisyear
FROM (SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2,
tumour_flag, sex, ethnicity, morph_icd10_o2, fiveyearageband, age, diagnosisyear,
RANK() OVER (PARTITION BY patientid ORDER BY
diagnosisdatebest asc, tumourid) AS rank_nmsc
FROM tr_nmsc_cohort
WHERE tumour_code = 'C44BCC'
AND ctry_code = 'E'
AND site_icd10_o2_3char = 'C44'
AND statusofregistration = 'F'
AND dedup_flag = '1'
AND age BETWEEN 0 AND 200
AND sex IN (1,2))
WHERE rank_nmsc = '1'
AND (diagnosisyear>2012 AND diagnosisyear<2019)

UNION

--select first ever cSCC per patient all time only
SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2, tumour_flag,
sex, ethnicity, morph_icd10_o2, fiveyearageband, age, diagnosisyear
```

CAS-SOP #4: Linking treatment tables

```
FROM (SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2,
tumour_flag, sex, ethnicity, morph_icd10_o2, fiveyearageband, age, diagnosisyear,
RANK() OVER (PARTITION BY patientid ORDER BY
diagnosisdatebest asc, tumourid) AS rank_nmsc
FROM tr_nmsc_cohort
WHERE tumour_code = 'C44CSCC'
AND ctry_code = 'E'
AND site_icd10_o2_3char = 'C44'
AND statusofregistration = 'F'
AND dedup_flag = '1'
AND age BETWEEN 0 AND 200
AND sex IN (1,2))
WHERE rank_nmsc = '1'
AND (diagnosisyear>2012 AND diagnosisyear<2019)

UNION

SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2, tumour_flag,
sex, ethnicity, morph_icd10_o2, fiveyearageband, age, diagnosisyear

FROM tr_nmsc_cohort
WHERE site_icd10_o2_3char = 'C44'
AND morph_icd10_o2 NOT IN ('8050', '8051', '8052', '8054', '8070', '8071', '8072', '8073', '8074', '8075',
'8076', '8077', '8078', '8082', '8083', '8084', '8085', '8086', '8090', '8091', '8092', '8093', '8094', '8095',
'8097')
AND (diagnosisyear>2012 AND diagnosisyear<2019)
AND ctry_code = 'E'
AND site_icd10_o2_3char = 'C44'
AND statusofregistration = 'F'
AND dedup_flag = '1'
AND age BETWEEN 0 AND 200
AND sex IN (1,2)
)

-- Create tumour cohort for all other (non C44 NMSC) tumours
SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2, tumour_flag,
figo, sex, ethnicity, morph_icd10_o2, fiveyearageband, age
FROM (
SELECT avt.tumourid, avt.patientid, avt.nhsnumber, avt.diagnosisdatebest, avt.site_icd10_o2, avt.figo,
avt.sex, avt.ethnicity, avt.morph_icd10_o2, avt.fiveyearageband, avt.age
```

CAS-SOP #4: Linking treatment tables

--Create amended tumour_code variable to differentiate between ovarian and non-ovarian C48 tumours, changes also for brain and testes.

```
,CASE
WHEN avt.site_icd10_o2_3char IN ('C48')
AND (avt.morph_icd10_o2 NOT IN (8693, 8800, 8801, 8802, 8803, 8804, 8805, 8806, 8963, 8990, 8991,
9040, 9041, 9042, 9043, 9044, 8810, 9490, 9500)
AND (avt.morph_icd10_o2 NOT BETWEEN 8811 AND 8921)
AND (avt.morph_icd10_o2 NOT BETWEEN 9120 AND 9373)
AND (avt.morph_icd10_o2 NOT BETWEEN 9530 AND 9582)
AND avt.sex=2)
THEN 'C48OVARY'
WHEN avt.site_icd10_o2_3char IN ('C48') THEN 'C48OTHER'
WHEN avt.site_icd10_o2 IN ('D391') THEN 'D39OVARY'
WHEN avt.site_icd10_o2_3char = 'D39' AND avt.site_icd10_o2 NOT IN ('D391') THEN 'D39OTHER'
WHEN avt.site_icd10_o2 IN ('D292') THEN 'D29TESTES'
WHEN avt.site_icd10_o2_3char = 'D29' AND avt.site_icd10_o2 NOT IN ('D292') THEN 'D29OTHER'
WHEN avt.site_icd10_o2 IN ('C751','C752','C753') THEN 'C75BRAIN'
WHEN avt.site_icd10_o2_3char = 'C75' AND avt.site_icd10_o2 NOT IN ('C751','C752','C753') THEN
'C75OTHER'
WHEN avt.site_icd10_o2 IN ('D320','D321','D329') THEN 'D32BRAIN'
WHEN avt.site_icd10_o2 IN ('D330','D331','D332','D333','D334','D337','D339') THEN 'D33BRAIN'
WHEN avt.site_icd10_o2 IN ('D352','D353','D354') THEN 'D35BRAIN'
WHEN avt.site_icd10_o2 IN ('D420','D421','D429') THEN 'D42BRAIN'
WHEN avt.site_icd10_o2 IN ('D430','D431','D432','D433','D434','D437','D439') THEN 'D43BRAIN'
WHEN avt.site_icd10_o2 IN ('D443','D444','D445') THEN 'D44BRAIN'
ELSE avt.site_icd10_o2_3char
END AS tumour_code,
```

-- This join flags any tumours diagnosed in 2013-18 that belong to a patient who had another tumour in the 18 months before or after that diagnosis

--(so that later, patient level datasets (hes, sact, rtds) are only used for patients with 1 tumour)

-- Tumour_flag = 1; the tumour belonged to a patient who had another tumour within 18 months

```
CASE WHEN ABS(avt.diagnosisdatebest-avt2.diagnosisdatebest)<548 THEN 1 ELSE 0 END AS
tumour_flag
```

-- In the process of joining AVT2 to AVT to identify multiple tumours, duplicate rows are generated

-- The difference between diagnosis date for tumours in AVT AND AVT2 ranks multiple tumours where more than one exists AND drops all but the closest tumour to the original tumour.

-- Where rk = 1; this is the tumour record to keep

CAS-SOP #4: Linking treatment tables

```
,RANK() OVER (PARTITION BY avt.tumourid ORDER BY ABS(avt.diagnosisdatebest-  
avt2.diagnosisdatebest) ASC, avt2.tumourid) AS rk  
FROM av2018.at_tumour_england@casref01 AVT
```

-- Multiple tumours join:

-- For tumours diagnosed from 2013-2018, identify any other tumour IDs that occurred between 2011-2020

-- A second copy of the tumour cohort (AVT2) is joined to the original tumour cohort of 2013-18 diagnoses (AVT)

-- Records from AVT2 are only joined if the patient ID is the same but the tumour ID is different

```
LEFT JOIN av2018.at_tumour_england@casref01 AVT2 ON avt.patientid=avt2.patientid  
AND NOT(avt.tumourid=avt2.tumourid)  
AND avt2.cascade_inci_flag = 1  
AND NOT(avt2.site_icd10_o2_3char='C44')  
AND avt2.site_icd10_o2_3char NOT IN  
( 'D01','D03','D04','D06','D07','D11','D13','D15','D16','D18','D25','D27','D36','D40','D48')  
AND avt2.diagnosisyear BETWEEN 2011 AND 2020
```

--Define cohort of interest here

```
WHERE avt.cascade_inci_flag = 1  
AND NOT(avt.site_icd10_o2_3char='C44')  
AND avt.site_icd10_o2_3char NOT IN  
( 'D01','D03','D04','D06','D07','D11','D13','D15','D16','D18','D25','D27','D36','D40','D48')  
AND avt.diagnosisyear BETWEEN 2013 AND 2018
```

--Removes duplicate tumour rows that had been added to identify patients with multiple tumours

```
)WHERE rk=1
```

-- Combine the C44 and non-C44 cohorts together into a single tumour cohort

```
UNION ALL
```

```
SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, tumour_code, site_icd10_o2, tumour_flag,  
NULL AS figo, sex, ethnicity, morph_icd10_o2, fiveyearageband, age  
FROM c44_cohort  
;
```

--Create table indexes for tumour cohort table

```
CREATE UNIQUE INDEX analysislouisereynolds.tr_tumcohort_tumourid_uq ON  
analysislouisereynolds.tr_tumour_cohort ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;  
CREATE INDEX analysislouisereynolds.tr_tumcohort_patientid_ix ON  
analysislouisereynolds.tr_tumour_cohort ( patientid ) NOLOGGING TABLESPACE analysisdata_IX;
```

CAS-SOP #4: Linking treatment tables

```
CREATE INDEX analysislouisereynolds.tr_tumcohort_nhsnumber_ix ON
analysislouisereynolds.tr_tumour_cohort ( nhsnumber ) NOLOGGING TABLESPACE analysisdata_IX;
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_tumour_cohort')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_tumcohort_tumourid_uq')
```

```
-----
-----CREATE SURGERY FLAG TABLES - ALL SITES-----
-----
```

```
--1)----- ALL SITES - SURGERY FROM AT_TREATMENT_ENGLAND -----
```

```
-- Create a surgery flag for the tumour if:
-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery
(event is '01a', '01b', or '01z')
-- and the opcs4_code is in the tumour resection list
-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)
```

```
CREATE TABLE tr_av_sg AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS avsg_flag
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk , eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
(avtreat.eventdate-tc.diagnosisdatebest) AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk
, avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.resect_time)
INNER JOIN analysislouisereynolds.opcs4resection_lookup_13_18@casref01 opcs ON
opcs.tumouricdsite3code = tc.tumour_code AND TRIM(opcs.opcsresectioncode) = avtreat.opcs4_code
)
WHERE rk=1
));
```

```
--2)----- ALL SITES - SURGERY FROM HES -----
```

CAS-SOP #4: Linking treatment tables

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the operation date (opertn) occurred in the relevant timeframe create table

```
CREATE TABLE tr_hes_sg AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS hessg_flag
, opdate AS hessg_date
, hessg_trust_code
FROM (
SELECT tumourid, datediff, rk , opdate, hessg_trust_code
FROM (
SELECT tc.tumourid,
ho.opdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS
rk
, ho.opdate
, procode3 AS hessg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN analysislouisereynolds.opcs4resection_lookup_13_18@casref01 opcs ON
opcs.tumouricdsite3code = tc.tumour_code AND TRIM(opcs.opcsresectioncode) = ho.opertn
)
)
WHERE rk=1
));
```

-----CREATE SURGERY FLAG TABLES - STAGE SPECIFIC RESECTIONS-----

--3)----- LIVER C22 - AT_TREATMENT_ENGLAND -----

-- Create a surgery flag for the tumour if:

-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery
(event is '01a', '01b', or '01z')

-- and the opcs4_code is a percutaneous radiofrequency AND microwave ablation of lesion of liver (see
SOP Appendices for list of opcs4 codes)

CAS-SOP #4: Linking treatment tables

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)
-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

```
CREATE TABLE tr_av_liver as (  
SELECT DISTINCT  
tumourid,  
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS liver_avtreat  
, eventdate AS avsg_date  
, avsg_trust_code  
FROM (  
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code  
FROM (  
SELECT tc.tumourid,  
avtreat.eventdate-tc.diagnosisdatebest AS datediff,  
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,  
avtreat.eventdate  
, avtreat.trust_code AS avsg_trust_code  
FROM tr_tumour_cohort tc  
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code  
= tc.tumour_code  
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid  
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND  
tim.resect_time)  
AND avtreat.opcs4_code IN ('J124','J127') AND tc.tumour_code IN ('C22'))  
WHERE rk=1));
```

--4)----- LIVER C22 - HES-----

-- Create a surgery flag for the tumour if:
-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields
-- and the opcs4_code is a percutaneous radiofrequency AND microwave ablation of lesion of liver (see
SOP Appendices for list of opcs4 codes)
-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)
-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria
in the final table)
-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final
table)

```
CREATE TABLE tr_hes_liver AS(  
SELECT DISTINCT  
tumourid,
```

CAS-SOP #4: Linking treatment tables

```
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS liver_hes
, opdate AS hessg_date
, hessg_trust_code
FROM (
SELECT tumourid, datediff, rk, opdate, hessg_trust_code FROM (
SELECT tc.tumourid,
ho.opdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,pos) AS rk
, ho.opdate
, procode3 AS hessg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
AND ho.opertn IN ('J124','J127') AND tc.tumour_code in ('C22'))
WHERE rk=1));
```

--5)----- OESOPHAGUS C15 - AT_TREATMENT_ENGLAND -----

-- Create a surgery flag for the tumour if:

-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery
(event is '01a', '01b', or '01z')

-- and the opcs4_code is a fiberoptic endoscopic resection of lesions of upper gastrointestinal tract AND
oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage
criteria in the final table)

```
CREATE TABLE tr_av_oesoph AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS oesoph_avtreat
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
```


CAS-SOP #4: Linking treatment tables

```
FROM (  
SELECT tc.tumourid,  
avtreat.eventdate-tc.diagnosisdatebest AS datediff,  
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,  
avtreat.eventdate  
, avtreat.trust_code AS avsg_trust_code  
FROM tr_tumour_cohort tc  
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code  
= tc.tumour_code  
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid  
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND  
tim.resect_time)  
AND avtreat.opcs4_code IN ('G421','G431','G146','G171','G438') AND tc.tumour_code IN ('C15'))  
WHERE rk=1));
```

--6)----- OESOPHAGUS C15 - HES -----

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4_code is a fiberoptic endoscopic resection of lesions of upper gastrointestinal tract AND
oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage
criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final
table)

```
CREATE TABLE tr_hes_oesoph AS(  
SELECT DISTINCT  
tumourid,  
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS oesoph_hes  
, oupdate AS hessg_date  
, hessg_trust_code  
FROM (  
SELECT tumourid, datediff, rk, oupdate, hessg_trust_code FROM (  
SELECT tc.tumourid,  
ho.opdate-tc.diagnosisdatebest AS datediff,  
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS  
rk  
, ho.opdate  
, procode3 AS hessg_trust_code  
FROM tr_tumour_cohort tc
```

CAS-SOP #4: Linking treatment tables

```
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
AND ho.opertn IN ('G421','G431','G146','G171','G438') AND tc.tumour_code IN ('C15'))
WHERE rk=1));
```

```
-----
--7)----- STOMACH C16 - AT_TREATMENT_ENGLAND -----
```

```
-- Create a surgery flag for the tumour if:
```

```
-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery
(event is '01a', '01b', or '01z')
```

```
-- and the opcs4_code is a fiberoptic endoscopic resection of lesions of upper gastrointestinal tract AND
oesophagus (see SOP Appendices for list of opcs4 codes)
```

```
-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)
```

```
-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage
criteria in the final table)
```

```
CREATE TABLE tr_av_stomach AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS stomach_avtreat
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,
avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.resect_time)
```

CAS-SOP #4: Linking treatment tables

```
AND avtreat.opcs4_code IN ('G421','G146','G449') AND tc.tumour_code IN ('C16'))
WHERE rk=1));
```

--8)----- STOMACH C16 - HES -----

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4_code is a fiberoptic endoscopic resection of lesions of upper gastrointestinal tract AND oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

```
CREATE TABLE tr_hes_stomach AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS stomach_hes
, oupdate AS hessg_date
, hessg_trust_code
FROM (
SELECT tumourid, datediff, rk, oupdate, hessg_trust_code FROM (
SELECT tc.tumourid,
ho.opupdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opupdate, hl.datayear,hl.epikeyanon,POS) AS
rk
, ho.opupdate
, procode3 AS hessg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opupdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
AND ho.opertn IN ('G421','G146','G449') AND tc.tumour_code IN ('C16'))
WHERE rk=1));
```

CAS-SOP #4: Linking treatment tables

--9)----- BLADDER CANCERS (C67) - AT_TREATMENT_ENGLAND-----

-- Create a surgery flag for the tumour if:

-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', or '01z')

-- and the opcs4_code is an endoscopic resections of lesion of bladder (TURBT) (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is T1 (non-muscle invasive) (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

```
CREATE TABLE tr_av_bladder AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS bladder1_avtreat
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,
avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.resect_time)
AND avtreat.opcs4_code IN ('M421', 'M422', 'M423', 'M428', 'M429') AND tc.tumour_code IN ('C67'))
WHERE rk=1));
```

--10)----- BLADDER CANCERS (C67) - HES -----

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4_code is an endoscopic resections of lesion of bladder (TURBT) (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is T1 (non-muscle invasive) (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

```

CREATE TABLE tr_hes_bladder AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS bladder1_hes
, odate AS hessg_date
, hessg_trust_code
FROM (
SELECT tumourid, datediff, rk, odate, hessg_trust_code FROM (
SELECT tc.tumourid,
ho.opdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS
rk
, ho.opdate
, procode3 AS hessg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
AND ho.opertn IN ('M421', 'M422', 'M423', 'M428', 'M429') AND tc.tumour_code IN ('C67'))
WHERE rk=1));

```

--11)----- CERVICAL CANCERS; CONE BIOPSIES - AT_TREATMENT_ENGLAND -----
-

- The final treatment table will create a surgery flag for the tumour if:
- The tumour received a cone biopsy and was FIGO stage 1a (see SOP Appendices for list of opcs4 codes)
- Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy
- Tables 11-14 flag the cone biopsies and lymphadenectomies, AND a cervical tumour resection flag will bring this together in the final table
- Create a cone biopsy flag for the tumour if:
- there is a record in at_treatment_england which states that the tumour was treated with surgery (event is '01a', '01b', or '01z')
- and the opcs4_code is a cone biopsy
- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

CAS-SOP #4: Linking treatment tables

```
CREATE TABLE tr_av_conebiops AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS conebiops_avtreat
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,
avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.resect_time)
AND avtreat.opcs4_code IN ('Q014','Q033','Q031','Q032') AND tc.tumour_code='C53')
WHERE rk=1));
```

--12)----- CERVICAL CANCERS; CONE BIOPSIES - HES -----

-- Create a cone biopsy flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4_code is a cone biopsy (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the patient only had one tumour in the time period of interest (this is incorporated in the final table)

```
CREATE TABLE tr_hes_conebiops AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS conebiops_hes
, oupdate AS hessg_date
, hessg_trust_code
FROM (
SELECT tumourid, datediff, rk, oupdate, hessg_trust_code FROM (
SELECT tc.tumourid,
ho.opupdate-tc.diagnosisdatebest AS datediff,
```

CAS-SOP #4: Linking treatment tables

```
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS
rk
, ho.opdate
, procode3 AS hessg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
AND ho.opertn IN ('Q014','Q033','Q031','Q032') AND tc.tumour_code='C53')
WHERE rk=1));
```

```
--13)----- CERVICAL CANCERS; LYMPHADENECTOMIES - AT_TREATMENT_ENGLAND -----
-----
```

```
-- Create a lymphadenectomy flag for the tumour if:
```

```
-- there is a record in at_treatment_england which states that the tumour was treated with surgery (event
is '01a', '01b', or '01z')
```

```
-- and the opcs4_code is a lymphadenectomy (see SOP Appendices for list of opcs4 codes)
```

```
-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)
```

```
CREATE TABLE tr_av_lymph AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS lymph_avtreat
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,
avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
```

CAS-SOP #4: Linking treatment tables

```
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time)
```

```
AND avtreat.opcs4_code IN ('T856','T859','T865') AND tc.tumour_code='C53')
```

```
WHERE rk=1));
```

```
--14)----- CERVICAL CANCERS; LYMPHADENECTOMIES - HES -----
```

```
-- Create a lymphadenectomy flag for the tumour if:
```

```
-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields
```

```
-- And the opcs4_code is a lymphadenectomy (see SOP Appendices for list of opcs4 codes)
```

```
-- And the operation date (opertn) occurred in the relevant timeframe (see SOP)
```

```
-- And the patient only had one tumour in the time period of interest (this is incorporated in the final table)
```

```
CREATE TABLE tr_hes_lymph AS(
```

```
SELECT DISTINCT
```

```
tumourid,
```

```
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS lymph_hes
```

```
, odate AS hessg_date
```

```
, hessg_trust_code
```

```
FROM (
```

```
SELECT tumourid, datediff, rk, odate, hessg_trust_code FROM (
```

```
SELECT tc.tumourid,
```

```
ho.opdate-tc.diagnosisdatebest AS datediff,
```

```
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,pos) AS rk
```

```
, ho.opdate
```

```
, procode3 AS hessg_trust_code
```

```
FROM tr_tumour_cohort tc
```

```
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code = tc.tumour_code
```

```
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
```

```
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon
```

```
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon
```

```
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
```

```
AND ho.opertn IN ('T856','T859','T865') AND tc.tumour_code='C53')
```

```
WHERE rk=1));
```

```
-----  
--15)----- COLORECTAL CANCERS; ENDOSCOPIES - AT_TREATMENT_ENGLAND-----
```

```
-- Create a surgery flag for the tumour if:
```


CAS-SOP #4: Linking treatment tables

-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', or '01z')

-- and the opcs4_code is an endoscopic resection or endoscopic biopsy procedure (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

```
CREATE TABLE tr_av_colorec AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec_avtreat
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,
avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.resect_time)
AND avtreat.opcs4_code IN
('H201','H412','H206','H231','H236','H205','H202','H122','H235','H239','H402','H232','H261','H208','H341','
H418',
'H209','H248','H238','H204','H419','H221','H251','H259','H229','H181','H281','H191','H561')
AND tc.tumour_code in ('C18', 'C19', 'C20'))
WHERE rk=1));
```

--16)----- COLORECTAL CANCERS; ENDOSCOPIES - HES -----

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4_code is an endoscopic resection or endoscopic biopsy procedure (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

CAS-SOP #4: Linking treatment tables

-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

```
CREATE TABLE tr_hes_colorec AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec_hes
, odate AS hessg_date
, hessg_trust_code
FROM (
SELECT tumourid, datediff, rk, odate, hessg_trust_code FROM (
SELECT tc.tumourid,
ho.opdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS
rk
, ho.opdate
, procode3 AS hessg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =
hl.epikeyanon
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =
hl.epikeyanon
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time
AND ho.opertn IN ('H201','H412','H206','H231','H236','H205','H202','H122','H235','H239','H402','H232',
'H261','H208','H341',
'H418','H209','H248','H238','H204','H419','H221','H251','H259','H229','H181','H281','H191','H561')
AND tc.tumour_code in ('C18', 'C19', 'C20'))
WHERE rk=1));
```

--17)----- COLORECTAL CANCERS; APPENDECTOMIES FOR APPENDIX TUMOURS ONLY
C18.1 - AT_TREATMENT_ENGLAND -----

-- Create a surgery flag for the tumour if:

-- there is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with surgery
(event is '01a', '01b', or '01z')

-- And the opcs4_code is an appendectomy procedure (see SOP Appendices for list of opcs4 codes)

-- And the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- And the tumour is an appendix tumour (C18.1)

```

CREATE TABLE tr_av_coloappen AS
(SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec_avtreat_appen
, eventdate AS avsg_date
, avsg_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avsg_trust_code
FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk,
avtreat.eventdate
, avtreat.trust_code AS avsg_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricd3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('01a','01b','01z') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.resect_time)
AND avtreat.opcs4_code IN ('H024','H019','H011') AND tc.site_icd10_o2 in ('C181'))
WHERE rk=1));

```

--18)----- COLORECTAL CANCERS; APPENDECTOMIES FOR APPENDIX TUMOURS ONLY
C18.1 - HES -----

-- Create a surgery flag for the tumour if:
-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields
-- and the opcs4_code is an appendectomy procedure (see SOP Appendices for list of opcs4 codes)
-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)
-- and the tumour is an appendix tumour (C18.1)
-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

```

CREATE TABLE
tr_hes_coloappen AS (
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec_hes_appen
, odate AS hessg_date
, hessg_trust_code

```

CAS-SOP #4: Linking treatment tables

```
FROM (  
SELECT tumourid, datediff, rk, oupdate, hessg_trust_code FROM (  
SELECT tc.tumourid,  
ho.opdate-tc.diagnosisdatebest AS datediff,  
RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS  
rk  
, ho.opdate  
, procode3 AS hessg_trust_code  
FROM tr_tumour_cohort tc  
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code  
= tc.tumour_code  
INNER JOIN heslive.hes_linkage_av_apc@casref01 hl ON tc.patientid = hl.patientid  
INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon =  
hl.epikeyanon  
INNER JOIN heslive.hesapc_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon =  
hl.epikeyanon  
AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect_time  
AND ho.opertn IN ('H024','H019','H011') AND tc.site_icd10_o2 in ('C181'))  
WHERE rk=1));
```

```
-----  
----- CREATE CHEMO FLAG TABLES -----  
-----
```

```
--19)----- ALL SITES - AVCT TABLE -----
```

```
-- Create a chemo flag for the tumour if:  
-- There is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with  
chemotherapy (event is either 'Cytotoxic Chemotherapy' (code = 02) or 'CT - Other' (code = CTX) or  
'chemoradiotherapy' (code = 04) or 'radioisotope therapy (including radioiodine)' (code = 19) or  
'Immunotherapy' (code = 15))  
-- AND the event date (eventdate) occurred in the relevant timeframe (see SOP)
```

```
CREATE TABLE tr_av_ct AS(  
SELECT DISTINCT  
tumourid,  
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS avct_flag  
, eventdate AS avct_date  
, avct_trust_code  
FROM (  
SELECT tumourid, datediff, rk ,eventdate, avct_trust_code FROM (  
SELECT tc.tumourid,  
avtreat.eventdate-tc.diagnosisdatebest AS datediff,  
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk  
, avtreat.eventdate
```

CAS-SOP #4: Linking treatment tables

```
, avtreat.trust_code AS avct_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('02','04','15','19','CTX') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31
AND tim.CHEMO_TIME)
)
WHERE rk=1));
```

--20)-----ALL SITES - SACT LEGACY -- UP TO 31 MARCH 2018 -----

```
-- Create a chemo flag for the tumour if:
-- there is a record in SACT LEGACY (excluding those null or classified as 'hormones' or 'Not chemo' or
'Zoledronic acid' or 'Pamidronate' or 'Denosumab')
-- AND the start date of the regimen (start_date_of_regimen) occurred in the relevant timeframe
-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final
table)
-- AND the start date of the regimen is up to 31 March 2018
```

```
CREATE TABLE tr_sact AS (
SELECT DISTINCT tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS sact_flag
, start_date_of_regimen AS sact_date
, sact_trust_code
FROM ( SELECT tumourid,datediff,rk , start_date_of_regimen, sact_trust_code
FROM ( SELECT tc.tumourid, sr.start_date_of_regimen-tc.diagnosisdatebest AS datediff, RANK() OVER
(PARTITION BY tc.tumourid ORDER BY sr.start_date_of_regimen, sr.merged_regimen_id,
st.merged_tumour_id) AS rk
, sr.start_date_of_regimen
, SUBSTR(st.organisation_code_of_provider,1,3) AS sact_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN sact_legacy.patient@casref01 sp ON tc.nhsnumber=sp.nhs_number
INNER JOIN sact_legacy.tumour@casref01 st ON sp.merged_patient_id=st.merged_patient_id
INNER JOIN sact_legacy.regimen@casref01 SR on st.merged_tumour_id=sr.merged_tumour_id
AND (NOT (benchmark_group IN ('NOT CHEMO','HORMONES','ZOLEDRONIC
ACID','PAMIDRONATE','DENOSUMAB') OR benchmark_group IS NULL))
AND sr.start_date_of_regimen-tc.diagnosisdatebest BETWEEN -31 AND tim.chemo_time
AND sr.start_date_of_regimen<=TO_DATE('2018-03-31','YYYY-MM-DD')
) WHERE rk=1
));
```

```

--21)-----ALL SITES - SACT ENCORE -- FROM 1 APRIL 2018 -----
-- Create a chemo flag for the tumour if:
-- there is a record in SACT ENCORE (excluding those null or classified as 'hormones' or 'Not chemo' or
'Zoledronic acid' or 'Pamidronate' or 'Denosumab')
-- AND the start date of the regimen (start_date_of_regimen) occurred in the relevant timeframe
-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final
table)
-- AND the start date of the regimen is from 1 April 2018 onwards
CREATE TABLE tr_sact_2 AS
(SELECT
DISTINCT tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS sact2_flag,
start_date_of_regimen AS sact2_date
, sact2_trust_code
FROM (SELECT /*+ USE_HASH(tc tim) USE_HASH(tim sp) USE_HASH(sp st) USE_HASH(st sr)*/
tumourid, datediff ,rk, start_date_of_regimen, sact2_trust_code
      FROM (SELECT tc.tumourid,
                  sr.start_date_of_regimen-tc.diagnosisdatebest AS datediff, RANK() OVER (PARTITION
BY tc.tumourid ORDER BY sr.start_date_of_regimen, sr.merged_regimen_id, st.sact_tumour_id) AS rk,
                  sr.start_date_of_regimen, SUBSTR(st.organisation_code_of_provider,1,3) AS
sact2_trust_code
      FROM tr_tumour_cohort tc
      INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 TIM ON
TIM.tumouricdsite3code = tc.tumour_code
      INNER JOIN sact.at_patient_england@cas2102 sp ON tc.nhsnumber=sp.nhs_number
      INNER JOIN sact.at_tumour_england@cas2102 st ON sp.encore_patient_id =
st.encore_patient_id
      INNER JOIN sact.at_regimen_england@cas2102 sr ON
st.sact_tumour_id=sr.sact_tumour_id
      AND (NOT (benchmark_group IN ('NOT CHEMO','HORMONES','ZOLEDRONIC
ACID','PAMIDRONATE','DENOSUMAB') OR benchmark_group IS NULL))
      AND sr.start_date_of_regimen-tc.diagnosisdatebest BETWEEN -31 AND
TIM.chemo_time
      AND sr.start_date_of_regimen>=TO_DATE('2018-04-01','YYYY-MM-DD')
      )
      WHERE rk=1
    ));

-----
----- CREATE RADIOTHERAPY FLAG TABLES -----
-----
--22)----- ALL SITES - AT_TREATMENT_ENGLAND -----

```

CAS-SOP #4: Linking treatment tables

-- Create a radiotherapy flag for the tumour if:
-- There is a record in AT_TREATMENT_ENGLAND which states that the tumour was treated with radiotherapy
--(event is either 'RT - Teletherapy' (code = 05) or 'chemoradiotherapy' (code = 04) or 'radiosurgery' (code = 22) or 'RT - Other/ NK' (code = RTX))
-- AND the event date (eventdate) occurred in the relevant timeframe (see SOP)

```
CREATE TABLE tr_av_rt AS(
SELECT DISTINCT
tumourid,
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS avrt_flag
, eventdate AS avrt_date
, avrt_trust_code
FROM (
SELECT tumourid, datediff, rk, eventdate, avrt_trust_code FROM (
SELECT tc.tumourid,
avtreat.eventdate-tc.diagnosisdatebest AS datediff,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk
, avtreat.eventdate
, avtreat.trust_code AS avrt_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN av2018.at_treatment_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid
AND eventcode IN ('04','05','22','RTX') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND
tim.RADIO_TIME)
)
WHERE rk=1
));
```

--23)-----ALL SITES - RTDS PRE APRIL 2016 (COLLECTED BY NATCANSAT)-----

-- Create a radiotherapy flag for the tumour if:
-- There is a record in rtds (excluding those classed as Brachytherapy, i.e., with RTTREATMENTMODALITY='06')
-- AND the appointment date (APPTDATE) occurred in the relevant timeframe
-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

```
CREATE TABLE
tr_rtds
AS(
SELECT DISTINCT
```

CAS-SOP #4: Linking treatment tables

```
tumourid,  
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS rtds_flag  
, apptdate AS rtds_date  
, rtds_trust_code  
FROM (  
SELECT tumourid,datediff,rk , apptdate, rtds_trust_code FROM (  
SELECT tc.tumourid, rl.apptdate-tc.diagnosisdatebest AS datediff,  
RANK() OVER (PARTITION BY tc.tumourid ORDER BY  
rl.apptdate,rl.attendid,rl.orgcodeprovider,pr.radiotherapyepisodeid,pr.prescriptionid) AS rk  
, rl.apptdate  
, CAST(SUBSTR(pr.orgcodeprovider,1,3) AS VARCHAR(3)) AS rtds_trust_code  
FROM tr_tumour_cohort tc  
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code  
= tc.tumour_code  
INNER JOIN rtds2016.opcds_cas1712_linkage rl ON tc.patientid=rl.patientid AND rl.apptdate-  
tc.diagnosisdatebest BETWEEN -31 AND tim.radio_time  
INNER JOIN rtds2016.rtds_prescriptions pr ON pr.orgcodeprovider = rl.orgcodeprovideR AND pr.attendid  
= rl.attendid  
AND pr.apptdate = rl.apptdate AND pr.rttreatmentmodality NOT IN ('06')  
)  
WHERE rk=1  
)  
);
```

--24)----- ALL SITES - RTDS POST APRIL 2016 (COLLECTED BY NCRAS; PROCESSED BY ENCORE) -----

-- Create a radiotherapy flag for the tumour if:

-- There is a record in rtds (excluding those classed as Brachytherapy, i.e., with
RTTREATMENTMODALITY='06')

-- AND the appointment date (APPTDATE) occurred in the relevant timeframe

-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final
table)

-- Do not flag the patient as receiving radiotherapy if the appointment date was before 1st April 2016

```
CREATE TABLE  
tr_rtds_2 AS (  
SELECT DISTINCT  
tumourid,  
CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS rtds2_flag  
, TO_DATE(apptdate) AS rtds2_date  
, rtds2_trust_code  
FROM (
```


CAS-SOP #4: Linking treatment tables

```
SELECT tumourid,datediff,rk, apptdate, rtds2_trust_code FROM (
SELECT tc.tumourid, TO_DATE(pr.apptdate)-tc.diagnosisdatebest AS datediff
, TO_DATE(pr.apptdate) AS apptdate,
RANK() OVER (PARTITION BY tc.tumourid ORDER BY
TO_DATE(pr.apptdate),pr.attendid,pr.orgcodeprovider,pr.radiotherapyepisodeid,pr.prescriptionid) AS rk
, pr.orgcodeprovider AS rtds2_trust_code
FROM tr_tumour_cohort tc
INNER JOIN analysislouisereynolds.timeframe_lookup_13_18@casref01 tim ON tim.tumouricdsite3code
= tc.tumour_code
INNER JOIN rtds.at_prescriptions_england@cas2102 pr ON pr.patientid=tc.patientid AND
pr.rttreatmentmodality NOT IN ('06')
AND pr.orgcodeprovider <>'7A3'
AND TO_DATE(pr.apptdate)-tc.diagnosisdatebest BETWEEN -31 AND tim.radio_time AND
TO_DATE(pr.apptdate) BETWEEN TO_DATE('01-APR-16', 'dd-mm-yy') AND TO_DATE('31-DEC-20
23:59:00', 'DD/MM/YY HH24:MI:SS')
)
WHERE rk=1
);
```

----- Index the tables from above-----

```
CREATE UNIQUE INDEX analysislouisereynolds.tr_AVCT_tumourid_uq ON
analysislouisereynolds.tr_av_CT ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_AVRT_tumourid_uq ON
analysislouisereynolds.tr_av_RT ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_AVSG_tumourid_uq ON
analysislouisereynolds.tr_av_sg ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_bladder1_tumourid_uq ON
analysislouisereynolds.tr_av_bladder ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_coloappen_tumourid_uq ON
analysislouisereynolds.tr_av_coloappen ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_colorec_tumourid_uq ON
analysislouisereynolds.tr_av_colorec ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_conebiops_tumourid_uq ON
analysislouisereynolds.tr_av_conebiops ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_liver_tumourid_uq ON
analysislouisereynolds.tr_av_liver ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_lymph_tumourid_uq ON
analysislouisereynolds.tr_av_lymph ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_oesoph_tumourid_uq ON
analysislouisereynolds.tr_av_oesoph ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
CREATE UNIQUE INDEX analysislouisereynolds.tr_av_stomach_tumourid_uq ON
analysislouisereynolds.tr_av_stomach ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
```

CAS-SOP #4: Linking treatment tables

```
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_CT')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_AVCT_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_RT')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_AVRT_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_sg')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_AVSG_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_bladder')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_bladder1_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_coloappen')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_coloappen_tumid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_colorec')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_colorec_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_conebiops')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_conebiops_tumid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_liver')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_liver_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_lymph')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_lymph_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_oesoph')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_oesoph_tumourid_uq')
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_av_stomach')
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_av_stomach_tumourid_uq')

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_sg_tumourid_uq ON
analysislouisereynolds.tr_hes_sg ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_bladder1_tumid_uq ON
analysislouisereynolds.tr_hes_bladder ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_coloappen_tumid_uq ON
analysislouisereynolds.tr_hes_coloappen ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_colorec_tumourid_uq ON
analysislouisereynolds.tr_hes_colorec ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_conebiops_tumid_uq ON
analysislouisereynolds.tr_hes_conebiops ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_liver_tumourid_uq ON
analysislouisereynolds.tr_hes_liver ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_lymph_tumourid_uq ON
analysislouisereynolds.tr_hes_lymph ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_oesoph_tumourid_uq ON
analysislouisereynolds.tr_hes_oesoph ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_hes_stomach_tumourid_uq ON
analysislouisereynolds.tr_hes_stomach ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr_rtds_tumourid_uq ON analysislouisereynolds.tr_rtds
( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
```

CAS-SOP #4: Linking treatment tables

```
CREATE UNIQUE INDEX analysislouisereynolds.tr_rtds_2_tumourid_uq ON  
analysislouisereynolds.tr_rtds_2 ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;  
CREATE UNIQUE INDEX analysislouisereynolds.tr_sact_tumourid_uq ON analysislouisereynolds.tr_sact  
( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;  
CREATE UNIQUE INDEX analysislouisereynolds.tr_sact_2_tumourid_uq ON  
analysislouisereynolds.tr_sact_2 ( tumourid ) NOLOGGING TABLESPACE analysisdata_IX;
```

```
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_sg')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_sg_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_bladder')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_bladder1_tumid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_coloappen')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_coloappen_tumid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_colorec')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_colorec_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_conebiops')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_conebiops_tumid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_liver')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_liver_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_lymph')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_lymph_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_oesoph')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_oesoph_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_hes_stomach')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_hes_stomach_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_rtds')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_rtds_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_rtds_2')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_rtds_2_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_sact')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_sact_tumourid_uq')  
EXECUTE dbms_stats.gather_table_stats('analysislouisereynolds', 'tr_sact_2')  
EXECUTE dbms_stats.gather_index_stats('analysislouisereynolds', 'tr_sact_2_tumourid_uq')
```

```
-----  
----- Create final table drawing on all previous tables-----  
-----
```

```
CREATE TABLE av_treatment_1318_4p6 NOLOGGING COMPRESS  
AS  
SELECT
```

CAS-SOP #4: Linking treatment tables

--Create radiotherapy (RT) flag for the tumour

--Only use the patient level datasets (rt ds, rtds2) if the patient had no other tumours recorded in the 18 months before or after this tumour diagnosis

CASE

WHEN avrt_flag=1 THEN 1

WHEN rtds_flag=1 AND tc.tumour_flag=0 THEN 1

WHEN rtds2_flag=1 AND tc.tumour_flag=0 THEN 1

ELSE 0

END AS rt_flag

--Create chemo (CT) flag for the tumour

--Only use the patient level datasets (sact, sact2) if the patient had no other tumours recorded in the 18 months before or after this tumour diagnosis

,CASE

WHEN avct_flag=1 THEN 1

WHEN sact_flag=1 AND tc.tumour_flag=0 THEN 1

WHEN sact2_flag=1 AND tc.tumour_flag=0 THEN 1

ELSE 0

END AS ct_flag

--Create resection flag for the tumour

--Only use the patient level datasets (hes) if the patient had no other tumours recorded in the 18 months before or after this tumour diagnosis

,CASE

-- Firstly, incorporate non-stage specific resection flag using opcs4 resection lookup table

WHEN AVSG_flag=1 THEN 1

WHEN hessg_flag=1 AND tc.tumour_flag=0 THEN 1

-- Secondly, incorporate stage specific rules for particular cancer sites

--Cervical

WHEN avt.site_icd10_o2_3char='C53' AND (upper(SUBSTR(tc.figo,1,2))) IN ('1A','IA') AND conebiops_avtreat=1 THEN 1

WHEN avt.site_icd10_o2_3char='C53' AND (upper(SUBSTR(tc.figo,1,2))) IN ('1A','IA') AND conebiops_hes=1 AND tc.tumour_flag=0 THEN 1

WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_avtreat=1) AND (lymph_avtreat=1) THEN 1

CAS-SOP #4: Linking treatment tables

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_avtreat=1) AND (lymph_hes=1 AND tc.tumour_flag=0) THEN 1
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_hes=1 AND tc.tumour_flag=0) AND (lymph_avtreat=1) THEN 1
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_hes=1 AND tc.tumour_flag=0) AND (lymph_hes=1 AND tc.tumour_flag=0) THEN 1
```

--colorectal:

```
WHEN avt.site_icd10_o2_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage_best,1,1)='1' AND colorec_avtreat=1 THEN 1
```

```
WHEN avt.site_icd10_o2_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage_best,1,1)='1' AND colorec_hes=1 AND tc.tumour_flag=0 THEN 1
```

--Sub rule for appendectomies for colorectal:

```
WHEN avt.site_icd10_o2 IN ('C181') AND colorec_avtreat_appen=1 THEN 1
```

```
WHEN avt.site_icd10_o2 IN ('C181') AND colorec_hes_appen=1 AND tc.tumour_flag=0 THEN 1
```

--bladder

```
WHEN avt.site_icd10_o2_3char IN ('C67') AND SUBSTR(avt.t_best, 1,1) = '1' AND bladder1_avtreat=1 THEN 1
```

```
WHEN avt.site_icd10_o2_3char IN ('C67') AND SUBSTR(avt.t_best, 1,1) = '1' AND bladder1_hes=1 AND tc.tumour_flag=0 THEN 1
```

-- liver

```
WHEN avt.site_icd10_o2_3char IN ('C22') AND SUBSTR(avt.stage_best,1,1)='1' AND liver_avtreat=1 THEN 1
```

```
WHEN avt.site_icd10_o2_3char IN ('C22') AND SUBSTR(avt.stage_best,1,1)='1' AND liver_hes=1 AND tc.tumour_flag=0 THEN 1
```

-- oesophagus

```
WHEN avt.site_icd10_o2_3char IN ('C15') AND SUBSTR(avt.stage_best, 1,2)='1A' AND oesoph_avtreat=1 THEN 1
```

```
WHEN avt.site_icd10_o2_3char IN ('C15') AND SUBSTR(avt.stage_best,1,2)='1A' AND oesoph_hes=1 AND tc.tumour_flag=0 THEN 1
```

-- stomach

```
WHEN avt.site_icd10_o2_3char IN ('C16') AND SUBSTR(avt.stage_best,1,2)='1A' AND stomach_avtreat=1 THEN 1
```

```
WHEN avt.site_icd10_o2_3char IN ('C16') AND SUBSTR(avt.stage_best,1,2)='1A' AND stomach_hes=1 AND tc.tumour_flag=0 THEN 1
```

```
ELSE 0
```

```
END AS sg_flag
```

CAS-SOP #4: Linking treatment tables

--Create cancer site names

```
,CASE WHEN tumour_code IN ('C67') THEN 'BLADDER'  
WHEN tumour_code IN ('C50') THEN 'BREAST'  
WHEN tumour_code IN ('C53') THEN 'CERVICAL'  
WHEN tumour_code IN ('C18','C19') THEN 'COLON'  
WHEN tumour_code IN ('C20') THEN 'RECTUM'  
WHEN tumour_code IN ('C01', 'C09', 'C10') THEN 'OROPHARYNX'  
WHEN tumour_code IN ('C02', 'C03', 'C04', 'C06') THEN 'ORAL_CAVITY'  
WHEN tumour_code IN ('C07', 'C08') THEN 'SALIVARY_GLANDS'  
WHEN tumour_code IN ('C12', 'C13') THEN 'HYPOPHARYNX'  
WHEN tumour_code IN ('C32') THEN 'LARYNX'  
WHEN tumour_code IN ('C05', 'C11', 'C14', 'C30', 'C31') THEN 'OTHER_HEAD_AND_NECK'  
WHEN tumour_code IN ('C64', 'C65', 'C66', 'C68') THEN 'KIDNEY'  
WHEN tumour_code IN ('C22') THEN 'LIVER'  
WHEN tumour_code IN ('C33', 'C34') AND tc.morph_icd10_o2 IN ('8041','8042','8043','8044','8045')  
THEN 'SCLC'  
WHEN tumour_code IN ('C33', 'C34') AND tc.morph_icd10_o2 NOT IN ('8041','8042','8043','8044','8045')  
THEN 'NSCLC'  
WHEN tumour_code IN ('C25') THEN 'PANCREAS'  
WHEN tumour_code IN ('C61') THEN 'PROSTATE'  
WHEN tumour_code IN ('C15') THEN 'OESOPHAGUS'  
WHEN tumour_code IN ('C56', 'C57','C48OVARY', 'D39OVARY') THEN 'OVARY'  
WHEN tumour_code IN ('C16') THEN 'STOMACH'  
WHEN tumour_code IN ('C54', 'C55') THEN 'UTERINE'  
WHEN tumour_code IN ('C51') THEN 'VULVA'  
WHEN tumour_code IN ('C70', 'C71', 'C72') THEN 'MALIGNANT BRAIN'  
WHEN tumour_code IN ('D32BRAIN', 'D33BRAIN', 'D42BRAIN', 'D43BRAIN') THEN 'NON-MALIGNANT  
BRAIN'  
WHEN tumour_code IN ('D35BRAIN') THEN 'BENIGN ENDOCRINE'  
WHEN tumour_code IN ('C75BRAIN', 'D44BRAIN') THEN 'NON-BENIGN ENDOCRINE'  
WHEN tumour_code IN ('C62', 'D29TESTES') THEN 'TESTES'  
WHEN tumour_code IN ('C43') THEN 'MELANOMA'  
WHEN tumour_code IN ('C44BCC') THEN 'NMSC_BCC'  
WHEN tumour_code IN ('C44CSCC') THEN 'NMSC_CSCC'  
WHEN tumour_code IN ('C44OTHER') THEN 'NMSC_OTHER'  
WHEN SUBSTR(tumour_code,1,1)='D' AND tumour_code NOT IN  
( 'D01', 'D03', 'D04', 'D06', 'D07', 'D11', 'D13', 'D15', 'D16', 'D18', 'D25', 'D27', 'D36', 'D40', 'D48', 'D29TESTES',  
'D32BRAIN', 'D33BRAIN', 'D35BRAIN', 'D39OVARY', 'D39OVARY', 'D42BRAIN', 'D43BRAIN',  
'D44BRAIN') THEN 'OTHER NON-MALIGNANT'  
ELSE 'OTHER MALIGNANT'  
END AS cancergroup
```

CAS-SOP #4: Linking treatment tables

```
,CASE  
WHEN ncr.cal19nm = 'National Cancer Vanguard: Greater Manchester' THEN 'Greater Manchester'  
WHEN ncr.cal19nm = 'National Cancer Vanguard: North Central AND North East London' THEN 'North  
Central AND North East London'  
WHEN ncr.cal19nm = 'National Cancer Vanguard: North West AND South West London' THEN 'North  
West AND South West London'  
WHEN ncr.cal19nm = 'West Yorkshire' THEN 'West Yorkshire AND Harrogate'  
ELSE ncr.cal19nm  
END AS cal19nm
```

-- Select all other variables

```
,avt.tumourid  
,avt.diagnosisyear  
,avt.age  
,avt.dco  
,avt.basisofdiagnosis  
,avt.ccg_code  
,avt.gor_code  
,avt.fiveyearageband  
,avt.sex  
,avt.ethnicity  
,chrl.chrl_tot_27_03  
,imd.quintile_2015  
,ncr.cal19cd  
--For checking  
,avt.morph_icd10_o2  
,tc.figo  
,avt.t_best  
,avt.stage_best  
,tc.site_icd10_o2  
,site_icd10_o2_3char  
,tc.tumour_flag
```

--Select dates of treatment from at_treatment_england

```
,avt.diagnosisdatebest  
,avt.deathdatebest  
,avct.avct_date  
,avrt.avrt_date  
,avsg.avsg_date
```

CAS-SOP #4: Linking treatment tables

--Select dates of treatment from patient-level datasets where only 1 tumour was diagnosed in 18 months before or after that tumour

```
,CASE WHEN tc.tumour_flag=0 THEN sact.sact_date END AS sact_date
,CASE WHEN tc.tumour_flag=0 THEN sact2.sact2_date END AS sact2_date
,CASE WHEN tc.tumour_flag=0 THEN rtds.rtds_date END AS rtds_date
,CASE WHEN tc.tumour_flag=0 THEN hessg.hessg_date END AS hessg_date
,CASE WHEN tc.tumour_flag=0 THEN rtds2.rtds2_date END AS rtds2_date
```

--Select date of surgery where there were additional site-specific resections flagged:

-----CERVICAL-----

-- Take date of cone biopsy in at_treatment_england if:

-- The tumour received a cone biopsy and was FIGO stage 1a

-- Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

, CASE

WHEN avt.site_icd10_o2_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND conebiops_avtreat=1 THEN cbavt.avsg_date

WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_avtreat=1) AND (lymph_avtreat=1) THEN cbavt.avsg_date

WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_avtreat=1) AND (lymph_hes=1 AND tc.tumour_flag=0) THEN cbavt.avsg_date

END AS cbavsg_date

-- Take date of cone biopsy in hes if:

--The tumour received a cone biopsy and was FIGO stage 1a

--Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

--and only 1 tumour was diagnosed in 18 months before or after that tumour

, CASE

WHEN avt.site_icd10_o2_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND conebiops_hes=1 AND tc.tumour_flag=0 THEN cbhes.hessg_date

WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_hes=1 AND tc.tumour_flag=0) AND (lymph_avtreat=1) THEN cbhes.hessg_date

WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops_hes=1 AND tc.tumour_flag=0) AND (lymph_hes=1 AND tc.tumour_flag=0) THEN cbhes.hessg_date

END AS cbhessg_date

-----colorectal-----

CAS-SOP #4: Linking treatment tables

-- As with cervical, select the date of the stage-specific resection for each tumour, according to the rules specified earlier for generating the stage-specific resection flag for that tumour site

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage_best,1,1)='1' AND colorec_avtreat=1 THEN coloavt.avsg_date
```

```
END AS coloavsg_date
```

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage_best,1,1)='1' AND colorec_hes=1 AND tc.tumour_flag=0 THEN colohes.hessg_date
```

```
END AS colohessg_date
```

```
,CASE WHEN avt.site_icd10_o2 IN ('C181') AND colorec_avtreat_appen=1 THEN coloavt_appen.avsg_date
```

```
END AS appenavsg_date
```

```
, CASE WHEN avt.site_icd10_o2 IN ('C181') AND colorec_hes_appen=1 AND tc.tumour_flag=0 THEN colohes_appen.hessg_date
```

```
END AS appenhessg_date
```

-----bladder-----

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C67') AND SUBSTR(avt.t_best, 1,1) = '1' AND bladder1_avtreat=1 THEN blad1_avt.avsg_date
```

```
END AS bladavsg_date
```

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C67') AND SUBSTR(avt.t_best, 1,1) = '1' AND bladder1_hes=1 AND tc.tumour_flag=0 THEN blad1_hes.hessg_date
```

```
END AS bladhessg_date
```

-----liver-----

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C22') AND SUBSTR(avt.stage_best,1,1)='1' AND liver_avtreat=1 THEN livavt.avsg_date
```

```
END AS livavsg_date
```

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C22') AND SUBSTR(avt.stage_best,1,1)='1' AND liver_hes=1 AND tc.tumour_flag=0 THEN livhes.hessg_date
```

```
END AS livhessg_date
```

-----oesophageal-----

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C15') AND SUBSTR(avt.stage_best,1,2)='1A' AND oesoph_avtreat=1 THEN oesoavt.avsg_date
```

```
END AS oesoavsg_date
```

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C15') AND SUBSTR(avt.stage_best,1,2)='1A' AND oesoph_hes=1 AND tc.tumour_flag=0 THEN oesoahes.hessg_date
```

```
END AS oesohessg_date
```

-----stomach-----

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C16') AND SUBSTR(avt.stage_best,1,2)='1A' AND stomach_avtreat=1 THEN stomavt.avsg_date
```

```
END AS stomavsg_date
```

CAS-SOP #4: Linking treatment tables

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C16') AND SUBSTR(avt.stage_best,1,2)='1A' AND  
stomach_hes=1 AND tc.tumour_flag=0 THEN stomhes.hessg_date  
END AS stomhessg_date
```

--Select trust codes from at_treatment_england

```
, avsg.avsg_trust_code  
, avct_trust_code  
, avrt_trust_code
```

--Select trust codes of treatment from patient-level datasets where only 1 tumour was diagnosed in 18 months before or after that tumour

```
,CASE WHEN tc.tumour_flag=0 THEN hessg.hessg_trust_code END AS hessg_trust_code  
,CASE WHEN tc.tumour_flag=0 THEN sact.sact_trust_code END AS sact_trust_code  
,CASE WHEN tc.tumour_flag=0 THEN sact2.sact2_trust_code END AS sact2_trust_code  
,CASE WHEN tc.tumour_flag=0 THEN rtds.rtds_trust_code END AS rtds_trust_code  
,CASE WHEN tc.tumour_flag=0 THEN rtds2.rtds2_trust_code END AS rtds2_trust_code
```

--Select trust codes of surgery where there were additional site-specific resections flagged:

-----CERVICAL-----

-- Take trust code of cone biopsy in at_treatment_england if:

-- The tumour received a cone biopsy and was FIGO stage 1a

-- Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

```
, CASE
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND  
conebiops_avtreat=1 THEN cbavt.avsg_trust_code
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN  
( '1B1','IB1')) AND (conebiops_avtreat=1) AND (lymph_avtreat=1) THEN cbavt.avsg_trust_code
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN  
( '1B1','IB1')) AND (conebiops_avtreat=1) AND (lymph_hes=1 AND tc.tumour_flag=0) THEN  
cbavt.avsg_trust_code
```

```
END AS cbavsg_trust_code
```

-- Take date of cone biopsy in hes if:

--The tumour received a cone biopsy AND was FIGO stage 1a

--Or the tumour received a cone biopsy AND was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

--AND only 1 tumour was diagnosed in 18 months before or after that tumour

```
, CASE
```

CAS-SOP #4: Linking treatment tables

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND  
conebiops_hes=1 AND tc.tumour_flag=0 THEN cbhes.hessg_trust_code
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN  
( '1B1','IB1')) AND (conebiops_hes=1 AND tc.tumour_flag=0) AND (lymph_avtreat=1) THEN  
cbhes.hessg_trust_code
```

```
WHEN avt.site_icd10_o2_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN  
( '1B1','IB1')) AND (conebiops_hes=1 AND tc.tumour_flag=0) AND (lymph_hes=1 AND tc.tumour_flag=0)  
THEN cbhes.hessg_trust_code
```

```
END AS cbhessg_trust_code
```

-----colorectal-----

-- As with cervical, select the date of the stage-specific resection for each tumour, according to the rules specified earlier for generating the stage-specific resection flag for that tumour site

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage_best,1,1)='1' AND  
colorec_avtreat=1 THEN coloavt.avsg_trust_code
```

```
END AS coloavsg_trust_code
```

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage_best,1,1)='1' AND  
colorec_hes=1 AND tc.tumour_flag=0 THEN colohes.hessg_trust_code
```

```
END AS colohessg_trust_code
```

```
,CASE WHEN avt.site_icd10_o2 IN ('C181') AND colorec_avtreat_appen=1 THEN  
coloavt_appen.avsg_trust_code
```

```
END AS appenavsg_trust_code
```

```
, CASE WHEN avt.site_icd10_o2 IN ('C181') AND colorec_hes_appen=1 AND tc.tumour_flag=0 THEN  
colohes_appen.hessg_trust_code
```

```
END AS appenhessg_trust_code
```

-----bladder-----

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C67') AND SUBSTR(avt.t_best, 1,1) = '1' AND  
bladder1_avtreat=1 THEN blad1_avt.avsg_trust_code
```

```
END AS bladavsg_trust_code
```

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C67') AND SUBSTR(avt.t_best, 1,1) = '1' AND  
bladder1_hes=1 AND tc.tumour_flag=0 THEN blad1_hes.hessg_trust_code
```

```
END AS bladhessg_trust_code
```

-----liver-----

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C22') AND SUBSTR(avt.stage_best,1,1)='1' AND  
liver_avtreat=1 THEN livavt.avsg_trust_code
```

```
END AS livavsg_trust_code
```

```
, CASE WHEN avt.site_icd10_o2_3char IN ('C22') AND SUBSTR(avt.stage_best,1,1)='1' AND  
liver_hes=1 AND tc.tumour_flag=0 THEN livhes.hessg_trust_code
```

```
END AS livhessg_trust_code
```

-----oesophageal-----

```
,CASE WHEN avt.site_icd10_o2_3char IN ('C15') AND SUBSTR(avt.stage_best,1,2)='1A' AND  
oesoph_avtreat=1 THEN oesoavt.avsg_trust_code
```

CAS-SOP #4: Linking treatment tables

END AS oesoavsg_trust_code

, CASE WHEN avt.site_icd10_o2_3char IN ('C15') AND SUBSTR(avt.stage_best,1,2)='1A' AND oesoph_hes=1 AND tc.tumour_flag=0 THEN oeso_hes.hessg_trust_code

END AS oeso_hessg_trust_code

-----stomach-----

, CASE WHEN avt.site_icd10_o2_3char IN ('C16') AND SUBSTR(avt.stage_best,1,2)='1A' AND stomach_avtreat=1 THEN stomavt.avsg_trust_code

END AS stomavsg_trust_code

, CASE WHEN avt.site_icd10_o2_3char IN ('C16') AND SUBSTR(avt.stage_best,1,2)='1A' AND stomach_hes=1 AND tc.tumour_flag=0 THEN stom_hes.hessg_trust_code

END AS stom_hessg_trust_code

-- final join of tables with flags

-- Treatment flag tables

-- Do not flag surgery for non-ovarian C48 tumour morphologies (these are classified as "other" tumours)

FROM av2018.at_tumour_england@casref01 AVT

INNER JOIN analysislouisereynolds.tr_tumour_cohort@casref01 tc ON avt.tumourid =tc.tumourid

LEFT JOIN analysislouisereynolds.tr_av_ct@casref01 avct ON avt.tumourid=avct.tumourid

LEFT JOIN analysislouisereynolds.tr_sact@casref01 sact ON avt.tumourid=sact.tumourid

LEFT JOIN analysislouisereynolds.tr_sact_2@casref01 sact2 ON avt.tumourid=sact2.tumourid

LEFT JOIN analysislouisereynolds.tr_av_rt@casref01 avrt ON avt.tumourid=avrt.tumourid

LEFT JOIN analysislouisereynolds.tr_av_sg@casref01 avsg ON avt.tumourid=avsg.tumourid AND (tc.tumour_code NOT IN ('C48OTHER'))

LEFT JOIN analysislouisereynolds.tr_rtds@casref01 rtds ON avt.tumourid=rtds.tumourid

LEFT JOIN analysislouisereynolds.tr_hes_sg@casref01 hessg ON avt.tumourid=hessg.tumourid AND (tc.tumour_code NOT IN ('C48OTHER'))

LEFT JOIN analysislouisereynolds.tr_rtds_2@casref01 rtds2 ON avt.tumourid=rtds2.tumourid

-- Add further joins for stage-specific resections:

-- add gynae tables:

LEFT JOIN analysislouisereynolds.tr_av_conebiops@casref01 CBAVT ON avt.tumourid=cbavt.tumourid

LEFT JOIN analysislouisereynolds.tr_hes_conebiops@casref01 CBhes ON avt.tumourid=cbhes.tumourid

LEFT JOIN analysislouisereynolds.tr_av_lymph@casref01 lyavt ON avt.tumourid=lyavt.tumourid

LEFT JOIN analysislouisereynolds.tr_hes_lymph@casref01 lyhes ON avt.tumourid=lyhes.tumourid

-- add colorectal tables:

LEFT JOIN analysislouisereynolds.tr_av_colorec@casref01 coloavt ON avt.tumourid=coloavt.tumourid

CAS-SOP #4: Linking treatment tables

```
LEFT JOIN analysislouisereynolds.tr_hes_colorec@casref01 colohes ON avt.tumourid=colohes.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_av_coloappen@casref01 coloavt_appen ON  
avt.tumourid=coloavt_appen.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_hes_coloappen@casref01 colohes_appen ON  
avt.tumourid=colohes_appen.tumourid
```

-- add urological tables:

```
LEFT JOIN analysislouisereynolds.tr_av_bladder@casref01 blad1_avt ON  
avt.tumourid=blad1_avt.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_hes_bladder@casref01 blad1_hes ON  
avt.tumourid=blad1_hes.tumourid
```

-- add UGI tables:

```
LEFT JOIN analysislouisereynolds.tr_av_liver@casref01 livavt ON avt.tumourid=livavt.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_hes_liver@casref01 livhes ON avt.tumourid=livhes.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_av_oesoph@casref01 oesoavt ON avt.tumourid=oesoavt.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_hes_oesoph@casref01 oesohe ON  
avt.tumourid=oesohe.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_av_stomach@casref01 stomavt ON avt.tumourid=stomavt.tumourid
```

```
LEFT JOIN analysislouisereynolds.tr_hes_stomach@casref01 stomhes ON  
avt.tumourid=stomhes.tumourid
```

-- Additional demographics

```
LEFT JOIN imd.id2015@casref01 imd ON imd.lsoa11_code=avt.lsoa11_code
```

```
LEFT JOIN av2018.charlson_2006to2018@casref01 chrl ON chrl.tumourid=avt.tumourid
```

```
LEFT JOIN analysisncr.lsoa_ccg_ca_stp_2019@casref01 ncr ON ncr.lsoa11cd=avt.lsoa11_code
```

```
LEFT JOIN (select avtu.tumourid
```

```
  , CASE WHEN avtu.stage_best is null THEN 'X'
```

```
    WHEN (SUBSTR(avtu.stage_best,1,1) NOT IN ('1','2','3','4')) THEN 'X'
```

```
    ELSE SUBSTR(avtu.stage_best,1,1) END AS stage
```

```
  from av2018.at_tumour_england@casref01 avtu
```

```
  WHERE avtu.diagnosisyear BETWEEN 2012 AND 2018
```

```
    AND (NOT (avtu.site_icd10_o2_3char='C50' AND SUBSTR(avtu.stage_best,1,1)='0') or  
  avtu.stage_pi is null)
```

```
) stage_nopagets
```

```
ON stage_nopagets.tumourid=avt.tumourid
```

```
;
```

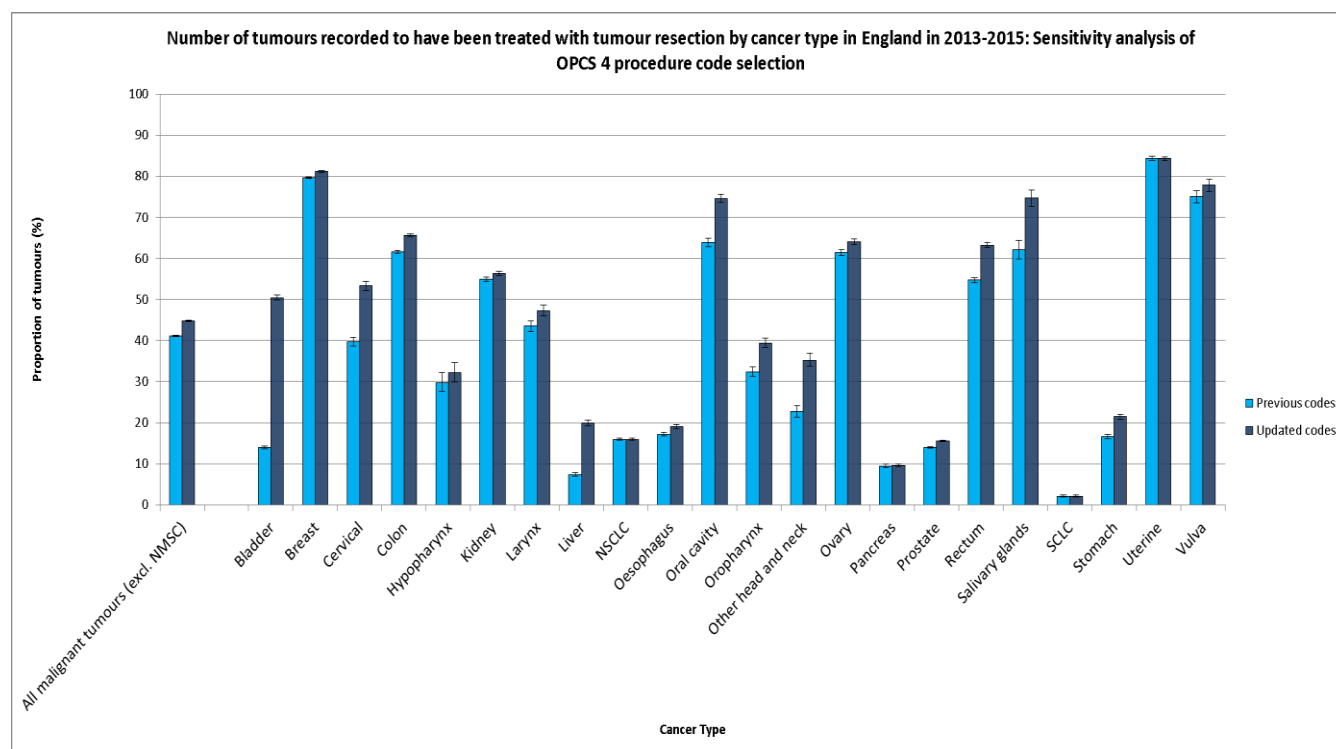
```
;
```

Appendix 5: Datasets used

Treatment type	Dataset	Data table version	Follow up period available	Linkage type	Data quality notes
Chemotherapy	Registry data from AT_TREATMENT_ENGLAND	AV2018.AT_TREATMENT_ENGLAND@CASREF01	Historical – November 2020	Tumour level	Corresponds with snapshot CAS2102.
Chemotherapy	Systemic Anti-Cancer Therapy (SACT) 2018	SACT_LEGACY.PATIENT, SACT_LEGACY.TUMOUR and SACT_LEGACY.REGIMEN @CASREF01	January 2013 – August 2020	Patient and tumour level	Data was not submitted regularly from all NHS Trusts until July 2014 onwards. Regimen start date used to identify date of chemotherapy may be inaccurate for some tumours diagnosed at the start of 2013.
Tumour resection	Registry data from AT_TREATMENT_ENGLAND	AV2018.AT_TREATMENT_ENGLAND@CASREF01AT_TREATMENT_ENGLAND	Historical – November 2020	Tumour level	Corresponds with snapshot CAS2102.
Tumour resection	Inpatient Hospital Episodes Statistics (HES) 2018	HESLIVE.HESAPC and HESLIVE.HESAPC_OPERTN @CASREF01	April 2000 – November 2020	Patient level	Where a time period of 18 months has been used, some tumours diagnosed in 2018 will not yet have surgery data recorded in HES, so the percentage receiving a tumour resection may be an underestimate.
Radiotherapy	Registry data from AT_TREATMENT_ENGLAND	AV2018.AT_TREATMENT_ENGLAND@CASREF01AT_TREATMENT_ENGLAND	Historical – November 2020	Tumour level	
Radiotherapy	Radiotherapy Dataset (RTDS) collected by NATCANSAT, pre April 2016	RTDS2016.RTDS_PRESCRIPTIONS@CASREF01	April 2009 – April 2016	Patient level	Brachytherapy & teletherapy variable known to be inaccurate (there is over allocation to brachytherapy & underreporting of teletherapy). Data may be incomplete for selected NHS Trusts. There are known to be undercounts in RTDS in the period between mid 2015 and March 2016.
Radiotherapy	Radiotherapy Dataset (RTDS) collected by PHE, post April 2016	RTDS.AT_PRESCRIPTIONS@CAS2102	April 2016 – December 2020	Patient level	As above

Appendix 6: Sensitivity analysis – impact of tumour resection code update

The list of relevant tumour resection codes was updated for SOP (v4.4) and previous versions of CAS-SOP#4, from a previous list that did not include stage-specific resections (available [here](#)). Please note, this analysis is from SOP (v4.4) and has not been updated for this v4.6 SOP update. Below is a comparison of the previous coding used and the current version, which includes stage-specific resections. The previous codelist was applied to the current sites (selected with the same ICD10 codes), and the same timeframes obtained from this SOP.



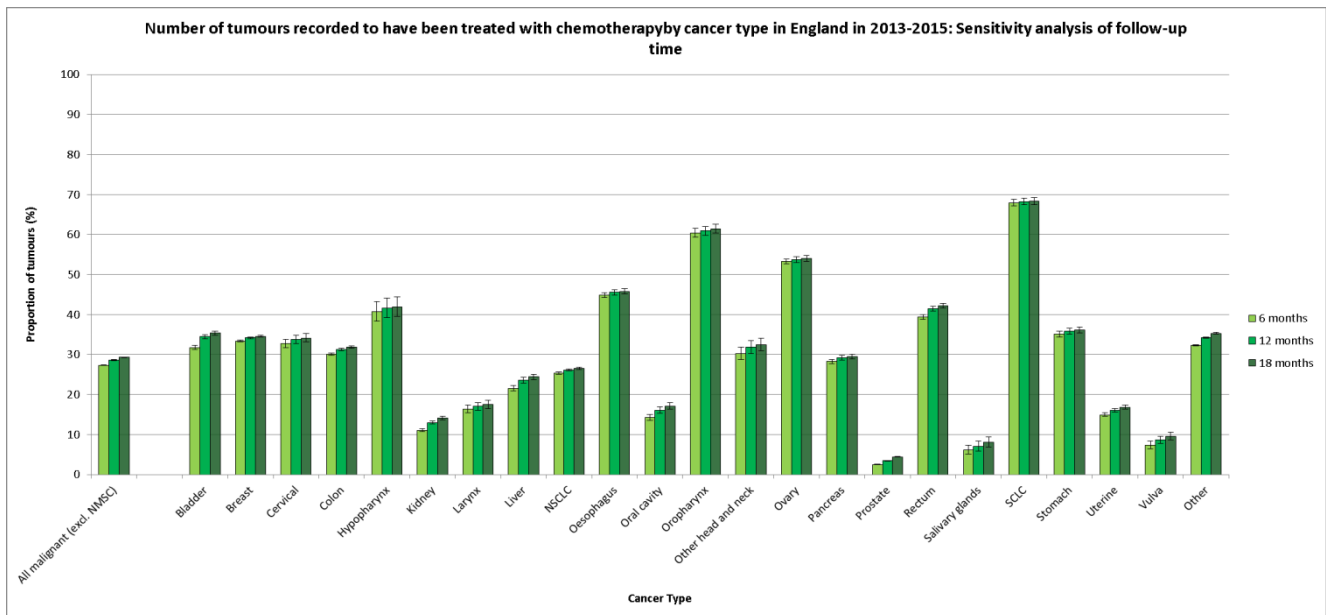
Findings

- For the 22 cancer sites with defined tumour resections codes, 41% of tumours had a tumour resection using the previous list of codes, and 45% had a tumour resection when using the updated list of codes, plus the site-specific additions (as listed in Appendix 3).
- Statistically significant differences between the proportions are present for all but three of the 22 sites (non-small lung cancer, small cell lung cancer and uterine cancers).
- The differences are most noticeable for bladder cancer (36% absolute difference), cervical (14% absolute difference), salivary glands (13% absolute difference), liver (13% absolute difference), and other head and neck (12% absolute difference).

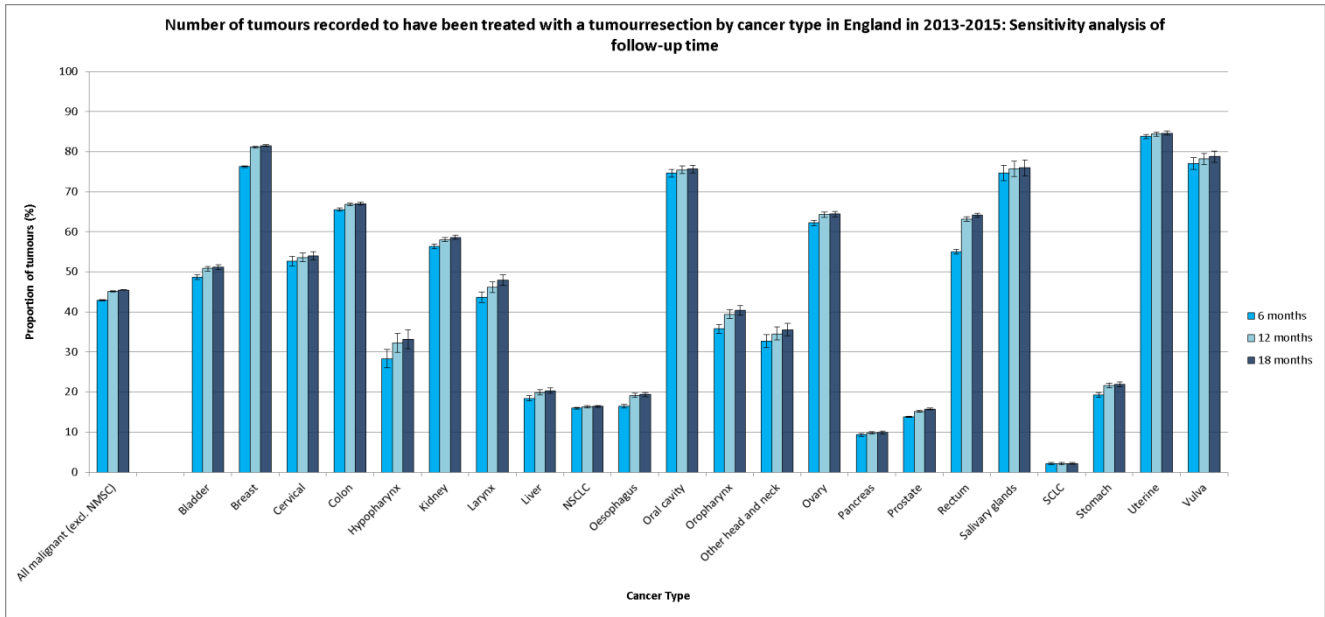
Appendix 7: Sensitivity analysis – impact of timeframe update

The timeframes as defined above may not capture all treatments for certain cancer sites (underestimate of true figure), or include treatments for recurrence (overestimate of true figure). Therefore, follow-up periods of 6/12/18 months were tested and the results are shown below. Please note, this analysis is from SOP (v4.4) and has not been updated for this v4.6 SOP update.

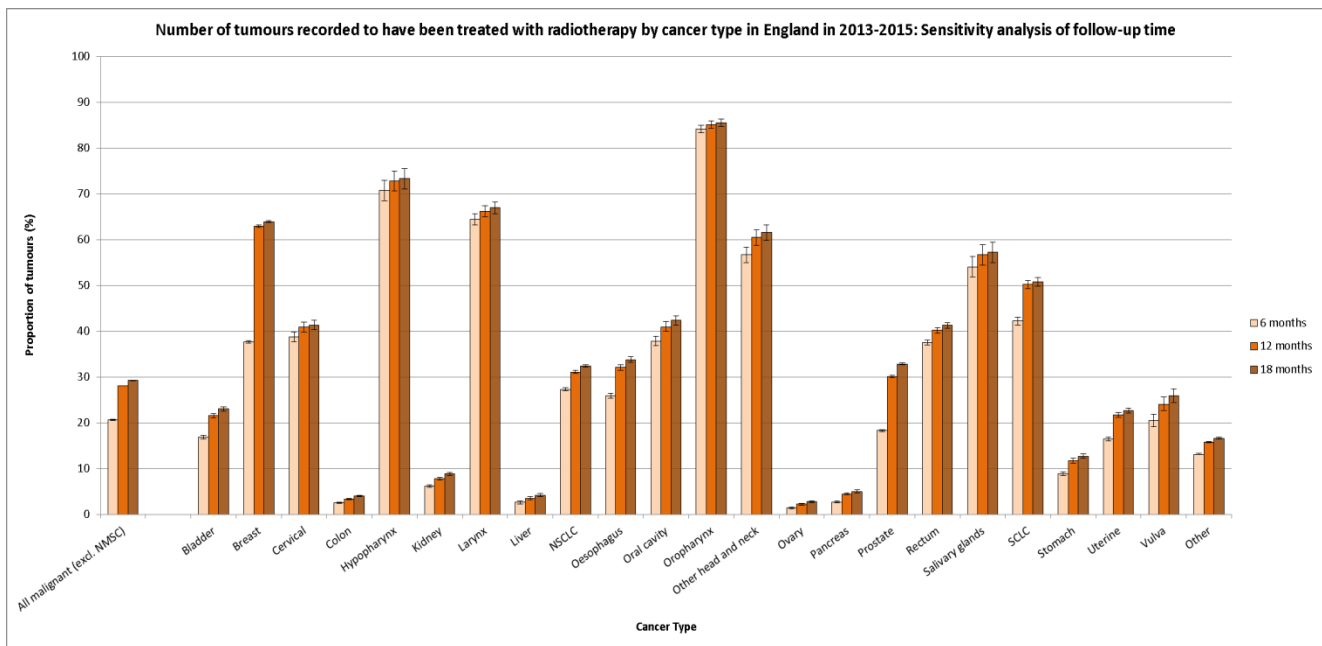
Chemotherapy



Tumour resections



Radiotherapy



Findings

- Overall across all sites (excluding NMSC), 27% of tumours received chemotherapy within six months of diagnosis, increasing to 29% within 12 and 18 months. Sites with the greatest absolute differences in proportions from six to 18 months are bladder, kidney, liver, oral cavity, rectum and other (3-4% absolute difference).
- Of the 22 cancer sites with defined tumour resections codes (excluding 'Other' sites), 43% of tumours received a tumour resection within six months of diagnosis, increasing to 45% within 12 and 18 months. Sites with the greatest absolute differences in proportions from six to 18 months are rectum, breast, hypopharynx and oropharynx (5-9% absolute difference).

- Overall across all sites (excluding NMSC), 20% of tumours received radiotherapy within six months of diagnosis, increasing to 28% within 12 months and 29% within 18 months. Sites with the greatest absolute differences in proportions from six to 18 months are breast, prostate, small cell lung cancer and oesophageal (8-26% absolute difference).