Royal College of Physicians | National Lung Cancer Audit

Analysis methodology for NLCA 2016 annual report

Updated January 2017

The national cancer registration and analysis service (NCRAS) will provide an extract of processed cases from the cancer registry that have a primary ICD-10 diagnosis of C34-C39 (malignant neoplasms of respiratory and intrathoracic organs i.e. lung cancer).

Historically, we know that some of these cases will include tumours that would not normally be considered as primary lung cancer (e.g. sarcoma). A list of valid morphology codes that have been found in our dataset and are included in the analysis is given in Appendix A. This list will be updated iteratively as necessary.

Derived Fields	
Date of diagnosis	Order of declining priority: 1. Date of first histological or cytological confirmation of this malignancy (with the exception of histology or cytology at autopsy). This date should be, in the following order: a. date when the specimen was taken, or b. date of receipt by the pathologist, or c. date of the pathology report 2. Date of admission to hospital because of this malignancy. 3. When evaluated at an out-patient clinic only: date of first consultation at the out-patient clinic because of this malignancy. 4. Date of diagnosis, other than 1, 2 or 3. 5. Date of death, if no information is available other than the fact that the patient has died because of malignancy. 6. Date of death, if the malignancy is discovered at autopsy.
Organisation first seen	Order of declining priority: 1. COSD CR1400 Organisation Site Code (Provider First Cancer Specialist) 2. COSD CR1410 Organisation Site Code (Provider First Seen) If neither of these fields are complete, or if they are contradictory then the following algorithm is applied: 1. Unprocessed records and a wide variety of events are reviewed to assign the Trust first seen 2. The earliest event in the cancer analysis system that can be linked to an organisation site code. 3. The organisation of diagnosis on ENCORE.
Pathological diagnosis	True if the patient has a valid morphology code recorded (pre- or post-treatment). See appendix A for list of pathology codes

Surgery	True if patient has a valid date for the following surgical	
	procedures:	
	E391	Open excision of lesion of trachea
	E398	Other specified partial excision of trachea
	E399	Unspecified partial excision of trachea
	E438	Other specified other open operations on trachea
	E461	Sleeve resection of bronchus and anastomosis HFQ
	E463	Excision of lesion of bronchus NEC
	E468	Other specified partial extirpation of bronchus
	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	Excision of segment of lung
	E558	Other specified open extirpation of lesion of lung
	E559	Unspecified open extirpation of lesion of lung
	T01	
Radical Radiotherapy	To be defined once we have access to the linked Radiotherapy	
	Data Set (RTDS). Patients were considered to have a valid radiotherapy related to lung cancer if they had a radiotherapy date from 1 January 2015. All radiotherapy episodes including palliative were considered.	
Pathologically-confirmed NSCLC	True if pathological diagnosis true and pathology is not small cell	
	lung cancer or Carcinoid.	
Active anti-cancer treatment	True if there is a recorded date of surgery, chemotherapy,	
	brachytherapy or radiotherapy.	

Data completeness – Case ascertainment

Description	Proportion of the expected number of patients with lung cancer first seen by an organisation
Rationale	All cases of lung cancer should be included in the audit in order to give an accurate reflection of the performance of an organisation.
Calculation	Numerator: number of lung cancer cases first seen by an organisation Denominator: number of expected cases based on three year rolling average (as recorded by NCRAS)
Target	>95%

Data completeness – Performance Status	
Description	Proportion of patients with lung cancer who have a valid performance status recorded
Rationale	Performance status is a key variable required for clinical decision making; it is also required for case-mix adjustment of outcome data
Calculation	Cohort: all cases of lung cancer Numerator: a number in cohort with a recorded PS of 0, 1, 2, 3, 4, 5 (dead) Denominator: number in cohort Exclusions: None
Target	>90% Deliberately not set to 100% to account for patients who are diagnosed after death

Data completeness – Stage

Description	Proportion of patients with lung cancer who have a valid disease stage recorded
Rationale	Stage is a key variable required for clinical decision making; it is also required for case-mix adjustment of outcome data. Stage can be recorded as pre-treatment, pathological, or integrated For the purposes of this measure we used the best stage data provided by NCRAS. .
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort with data that allows a calculation of a TNM stage group. NCRAS will use all potential sources of staging data (e.g. COSD, pathology reports, imaging reports) to identify the most accurate possible stage. Denominator: number in cohort Exclusions: None
Target	>90%. Deliberately not set to 100% to account for patients who are diagnosed after death.

Data completeness – Nurse Specialist

Description	Proportion of patients with lung cancer who have a valid lung cancer nurse	
	specialist indicator code recorded	
Rationale	Access to a lung cancer nurse specialist is a crucial aspect of the patient pathway	
	both in terms of experience and outcomes.	
Calculation	Cohort: all cases of lung cancer	
	Numerator: number in cohort with any of the following clinical nurse specialist	
	codes:	
	Y1	Yes - Clinical Nurse Specialist present when PATIENT given diagnosis
	Y3	Yes - Clinical Nurse Specialist not present when PATIENT given diagnosis
	but saw PATIENT during same Consultant Clinic Session	
	Y4	Yes - Clinical Nurse Specialist not present during Consultant Clinic Session
	when PATIENT given diagnosis but saw PATIENT at other time	
	NI	No - PATIENT not seen at all by Clinical Nurse Specialist but Clinical Nurse
	Specialist informed of diagnosis	
	NN	No - PATIENT not seen at all by Clinical Nurse Specialist and Clinical
	Nurse Specialist not informed of diagnosis	
	Denominator: number in cohort	
	Exclusions: None	
Target	>90%.	

Data completeness – Pathology (SNOMED) code	
Description	Proportion of patients with lung cancer who have a valid pathology (morphology) code recorded
Rationale	The pathological confirmation rate cannot be monitored in “real time” since it requires integration of data from a variety of sources. Monitoring the completeness of this field does however provide some feedback on completeness of recording of pathological data. Since cancer registration rules require a pathology code to be recorded in all cases, this measure excludes codes M8000/1, M8002/3, M9990/3 M8000/3, M8000/6, M8000/9, M8001/3, M8010/3, M8010/6, M8010/9 which are usually used where no pathological sample is available.
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort with a valid pathology code recorded (as defined above) Denominator: number in cohort Exclusions: Sarcomas
Target	N/A

Data completeness – Treatment Start Date	
Description	Proportion of patients with lung cancer who have a valid treatment start date recorded (includes active monitoring and palliative care).
Rationale	A treatment date is necessary to confirm that a treatment has been started.
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort with any valid treatment start date recorded (including active monitoring and palliative care) including data on treatment from HES, RTDS and SACT. Denominator: number in cohort Exclusions: None
Target	>90%.

Data completeness – Lung Function	
Description	Proportion of patients with potentially radically treatable lung cancer who have lung function recorded
Rationale	Lung function is required to determine fitness for radical treatment and will be used in case-mix adjustment of outcome measures
Calculation	Cohort: all cases of stage I and II lung cancer with performance status 0 or 1 Numerator: number in cohort with a) FEV_1 (absolute) and b) FEV_1 (%) recorded Denominator: number in cohort Exclusions: None
Target	>90%

Pathological Confirmation

Description	Proportion of patients who have a pathological confirmation of their cancer diagnosis
Rationale	A definitive diagnosis is valuable in helping inform patients and carers about the nature of the disease, the likely prognosis and treatment choice. Appropriate treatment of lung cancer depends on accurate diagnosis and distinction between histological types of lung cancer.
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort with a pathological diagnosis (as defined above) Denominator: number in cohort Exclusions: None
Target	>75%

NSCLC NOS Rate

Description	Proportion of patients with *pathologically-confirmed* NSCLC whose pathology is recorded as M8046/3 (NSCLC NOS).
Rationale	Adequate tissue sampling should be undertaken, ensuring appropriate balance of risk to patients, to allow for pathological diagnosis including tumour sub-typing and analysis of predictive markers. Newer drug treatments for NSCLC work best if they are targeted on the basis of histological sub-type and/or predictive markers.
Calculation	Cohort: all cases of pathologically-confirmed NSCLC (as defined above) Numerator: number in cohort with a calculated final histology of M8046/3. Denominator: number in cohort Exclusions: None
Target	<15%

Valid EGFR status recorded

Description	Proportion of patients with pathologically-confirmed stage IIIB and IV non-squamous NSCLC with a valid EGFR status recorded
Rationale	Adequate tissue sampling should be undertaken, ensuring appropriate balance of risk to patients, to allow for pathological diagnosis including tumour sub-typing and analysis of predictive markers. Newer drug treatments for NSCLC work best if they are targeted on the basis of histological sub-type and/or predictive markers.
Calculation	Cohort: all cases of pathologically-confirmed NSCLC (as defined above) with stage IIIB or stage IV disease Numerator: number in cohort with a valid EGFR status recorded i.e. COSD LU10 090 result equals 1. Wild type or 2. Mutation Denominator: number in cohort Exclusions: Patients with NSCLC who have squamous histology
Target	>95% This target reflects the acknowledgement that local protocols may preclude patients with early stage disease from undergoing testing.

PET-CT before surgery or radical radiotherapy	
Description	Proportion of patients who have a PET-CT scan carried out before surgery or radical radiotherapy
Rationale	Accurate staging is important to ensure appropriate treatment is delivered to patients with lung cancer. All patients being considered for radical treatment with curative intent should have a PET CT scan completed and reported by the multidisciplinary team before treatment
Calculation	Cohort: all cases who receive surgery or radical radiotherapy(as defined above) Numerator: number in cohort with a valid date of PET-CT scan, and that date is before the date of surgery or radical radiotherapy treatment. Denominator: number in cohort Exclusions: None
Target	>95% Some patients will refuse to undergo PET CT.

Seen by LCNS	
Description	Proportion of patients who have contact with a lung cancer specialist nurse
Rationale	Access to a lung cancer nurse specialist is a crucial aspect of the patient pathway both in terms of experience and outcomes.
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort with a record of contact with a LCNS (COSD CR2050 codes Y1, Y3, Y4) Denominator: number in cohort Exclusions: None
Target	>90%

LCNS present at Diagnosis	
Description	Proportion of patients who have a lung cancer specialist nurse present when they receive their cancer diagnosis
Rationale	Access to a lung cancer nurse specialist is a crucial aspect of the patient pathway both in terms of experience and outcomes.
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort where a LCNS was present when they received their diagnosis (COSD CR2050 code Y1) Denominator: number in cohort Exclusions: None
Target	>80%

Time from diagnosis to treatment in small cell lung cancer (SCLC)

Description	Proportion of patients with SCLC who receive chemotherapy treatment within 2 weeks of diagnosis.
Rationale	SCLC is an aggressive tumour that may progress rapidly. Access to early treatment is important to prevent patients deteriorating and becoming too unwell to receive treatment.
Calculation	Cohort: all cases of SCLC (pathology code = M8041) with a chemotherapy start date Numerator: number in cohort where the time between the date of diagnosis (as defined above) where pathology code = M8041 and the chemotherapy start date is <=14 days Denominator: number in cohort Exclusions: None
Target	>90%

Active anti-Cancer Treatment

Description	Proportion of patients who receive anti-cancer treatment
Rationale	Anti-cancer treatment is recommended for all patients, dependent upon patient preference and fitness, in order to increase survival and to improve quality of life.
Calculation	Cohort: all cases of lung cancer Numerator: number in cohort with a valid start date for active anti-cancer treatment (as defined above) Denominator: number in cohort Exclusions: none
Target	Case-mix adjusted odds ratios

Stage I and II NSCLC receiving surgery or radical radiotherapy

Description	Proportion of patients with Stage I and II disease who receive active anti-cancer treatment delivered with radical intent.
Rationale	Early stage lung cancer is usually amenable to curative treatment. Surgery is the first choice treatment for patients with early lung cancer for patients whom are medically operable. Radical radiotherapy is recommended for patients who are not fit enough to undergo surgery.
Calculation	Cohort: all cases of non-small cell lung cancer of stage I and II Numerator: number in cohort who receive surgery or radical radiotherapy (as defined above). Denominator: number in cohort Exclusions: Patients with small cell lung cancer.
Target	Case-mix adjusted odds ratios

SCLC having chemotherapy

Description	Proportion of patients with small cell lung cancer who undergo chemotherapy
Rationale	Patients with SCLC should receive combination chemotherapy, dependant on fitness levels, as this has a proven survival benefit and provides palliation for symptoms caused by primary or metastatic tumour.
Calculation	Cohort: all cases of pathologically confirmed SCLC Numerator: number in cohort with a recorded date of chemotherapy Denominator: number in cohort Exclusions: none
Target	Case-mix adjusted odds ratios

NSCLC (stage IIIB & IV, PS 0-1) having chemotherapy

Description	Proportion of patients with advanced NSCLC and adequate fitness who undergo chemotherapy
Rationale	Patients with stage III or IV NSCLC should be offered chemotherapy, dependant on fitness level, as this is proven to improve survival, provides palliation for symptoms caused by primary or metastatic tumour and improves quality of life.
Calculation	Cohort: all cases of *pathologically-confirmed* NSCLC with PS 0 or 1 and TNM group IIIB or IV. Numerator: number in cohort with a recorded date of chemotherapy Denominator: number in cohort Exclusions: none
Target	Case-mix adjusted odds ratios

NSCLC stage IIIB & IV non-squamous EGFR mutation positive receiving TKI treatment

Description	Proportion of patients with NSCLC and a sensitising EGFR mutation who receive drug therapy with an EGFR-TKI.
Rationale	For patients with advance NSCLC and a sensitising EGFR mutation, treatment with an EGFR-TKI is recommended.
Calculation	Cohort: all cases pathological confirmed NSCLC (excluding squamous) stage IIIB or IV where LU10 090 equals 2-Mutation Numerator: number in cohort who receive an EGFR-TKI (erlotinib, gefitinib, afatanib) Denominator: number in cohort Exclusions: SCLC, squamous cell carcinoma
Target	Case-mix adjusted odds ratios

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NLCA Valid Morphological Codes

Morphology codes required for patient to be considered to have a histologically confirmed diagnosis. Please note that the "basis of diagnosis" COSD item for the patient should also be either: Histology of Primary, Histology of Mets or Cytology.

Adenocarcinomas	
Code	Definition
M81403	ADENOCARCINOMA
M81405	MICROINVASIVE ADENOCARCINOMA
M82503	BRONCHIOLO-ALVEOLAR ADENOCARCINOMA
M82513	ALVEOLAR ADENOCARCINOMA
M82113	TUBULAR ADENOCARCINOMA
M82603	PAPILLARY ADENOCARCINOMA
M83103	CLEAR CELL ADENOCARCINOMA
M83233	MIXED CELL ADENOCARCINOMA
M83333	FETAL ADENOCARCINOMA
M84703	MUCINOUS CYSTADENOCARCINOMA
M84803	MUCINOUS ADENOCARCINOMA
M84813	MUCIN-PRODUCING ADENOCARCINOMA

Squamous Cell Carcinoma	
Code	Definition
M80703	SQUAMOUS CELL CARCINOMA
M80713	SQUAMOUS CELL CARCINOMA KERATINISING TYPE
M80723	SQUAMOUS CELL CARCINOMA LARGE CELL NON-KERATINISING TYPE
M80733	SQUAMOUS CELL CARCINOMA SMALL CELL NON-KERATINISING TYPE
M80743	SQUAMOUS CELL CARCINOMA SPINDLE CELL TYPE
M80843	SQUAMOUS CELL CARCINOMA CLEAR CELL TYPE
M80523	PAPILLARY SQUAMOUS CELL CARCINOMA
M80833	BASALOID SQUAMOUS CELL CARCINOMA

Non-Small Cell Lung Cancer (excluding Squamous and Adeno-carcinomas)	
Code	Definition
M80133	LARGE CELL NEUROENDOCRINE CARCINOMA
M80203	CARCINOMA UNDIFFERENTIATED TYPE
M80123	LARGE CELL CARCINOMA
M80213	CARCINOMA ANAPLASTIC TYPE
M80223	PLEOMORPHIC CARCINOMA
M80313	GIANT CELL CARCINOMA
M80323	SPINDLE CELL CARCINOMA
M80333	PSEUDOSARCOMATOUS CARCINOMA
M80463	NON-SMALL CELL CARCINOMA
	Continued…

Non-Small Cell Lung Cancer (excluding Squamous and Adeno-carcinomas) (cont..)	
Code	Definition
M80503	PAPILLARY CARCINOMA (SQUAMOUS)
M80823	LYMPHOEPITHELIAL CARCINOMA
M81233	BASALOID CARCINOMA
M82003	ADENOID CYSTIC CARCINOMA
M82443	COMPOSITE CARCINOID
M82463	NEUROENDOCRINE CARCINOMA
M82523	BRONCHIOLO-ALVEOLAR CARCINOMA, NON-MUCINOUS
M82533	BRONCHIOLO-ALVEOLAR CARCINOMA, MUCINOUS
M82543	BRONCHIOLO-ALVEOLAR CARCINOMA, MIXED MUCINOUS AND NON-MUCINOUS
M83203	GRANULAR CELL CARCINOMA
M84903	SIGNET RING CELL CARCINOMA
M85503	ACINAR CELL CARCINOMA
M85603	ADENOSQUAMOUS CARCINOMA
M89803	CARCINOSARCOMA
M82403	CARCINOID TUMOUR (NOT APPENDIX)

Small cell lung cancer	
Code	Definition
M80413	SMALL CELL LUNG CANCER NOS
M80423	OAT CELL CARCINOMA
M80433	SMALL CELL CARCINOMA, FUSIFORM CELL
M80443	SMALL CELL CARCINOMA, INTERMEDIATE CELL
M80453	MIXED SMALL CELL

Mesothelioma	
Code	Definition
M90503	MESOTHELIOMA NOS
M90513	FIBROUS MESOTHELIOMA, NOS SPINDLED MESOTHELIOMA SARCOMATOID MESOTHELIOMA DESMOPLASTIC MESOTHELIOMA
M90523	EPITHELIOID MESOTHELIOMA
M90533	BIPHASIC MESOTHELIOMA